

ABSTRACT

Title of thesis: CONFLUENCE STATION: A BICYCLE STATION
FOR DENVER, COLORADO

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This thesis proposes a design for a community transit center which promotes the ideas of living and working downtown, the use of non-polluting transportation alternatives and living in harmony with the natural environment.

The proposed facility will be located at the confluence of the South Platte River and the Cherry Creek, accessed by existing bicycle trails, and connected to the fabric of the city through local public transportation systems. The building itself will primarily serve the needs of bicyclists and pedestrians, thus making commuting by bicycle a more viable and attractive option for more people. The building itself will be as sustainable as possible with the intention of creating an easily understood model of a building existing in harmony with its surroundings.

The building will be designed with the intention of embodying the spirit of the place and celebrating the landscape, historical heritage, and prospects for the city's future.

An Alternative Transportation Center,
Denver, Colorado

by

Cynthia Denise Leibman

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INTRODUCTION

Denver is a rapidly growing city, struggling to define its character, limits and direction for the future. Over 2 million people live in the Denver metropolitan area, yet the downtown area is still struggling to revitalize itself from its former existence as the home of a rather desolate central business district. The lower downtown (LoDo) area is currently being revitalized rather successfully, and many of the city's traditional residential neighborhoods are thriving, yet the connections between these areas often deteriorate along the primary transit corridors leaving the city fragmented. The entire region is facing rather serious environmental crises threatening the quality of life. The impact of severe drought, pollution and the loss of agricultural land to sprawling development can now be felt by all of the residents of the region and has begun to affect daily life. This thesis will propose a community building which intends to address these problems by promoting the idea of living and working downtown, creating clear connections between fragmented areas along a transit corridor, and addressing the local environmental concerns through both the form and the purpose of the proposed building.

The building proposed in this project will be an alternative transportation center which will also contain many community functions. The facility will be located along the South Platte River, accessed by existing bicycle trails, and connected to the fabric of the city and the existing Light Rail transit system by way of additional bicycle and pedestrian trails. The primary transit corridor enhanced in this case will be the existing bicycle trail that many people currently use for commuting. The proposed project will

make commuting by bicycle a more viable and attractive option for more people. Bicycling is already extremely popular in the area, the city has recognized this through their development of a Bicycle Master Plan. The proposed Bike Station will thus be working in collaboration with the stated intentions of the city. The intention of the actual construction of the structure will be one which also promotes respect for and cooperation with the surrounding environment. The building may be constructed out of unconventional or recycled materials and will be as sustainable as is appropriate. The intention is to create a building which will serve as an easily understood model of a building which exists in harmony with its surroundings, both natural and man made.

In order to achieve these goals, an understanding of the character of the city, the landscape, and the values and goals of the people who live there must be attained. The project proposed by this document will be one which intends to elucidate the character of the connection of the people of Denver to their surrounding climate and landscape through its image and form. The building will be designed with the intention of embodying the spirit of the place and celebrating the landscape, historical heritage of the city, and the prospects for the city's future. It will facilitate and promote a pedestrian lifestyle and the use of alternative transportation as well as the use of alternative forms of energy (solar and wind power are both realistic options in the region) as well as the use of alternative building materials.

We are facing a major crisis in the world today: how do we continue to live and develop our civilization without further destruction of our environment. We have the

tools and resources in order to reduce our impact on the earth and increase our connection to it, but we must begin to use them. If William McDonough's "triple bottom line" concept is adopted, then the financial, environmental, and social dimensions of any project must be considered with equal value.¹ The proposed Bike Station will create a building which addresses all three of those aspects through its purpose as well as through its form. Socially, the Bike Station will bring people from the community together, creating a new community center, promoting a recreational lifestyle, and enticing more people to come from the suburbs into the city in an enjoyable way. Environmentally, the Bike Station promotes the use of alternative transportation on a daily basis to reduce pollution as well as to improve both the physical and mental health of commuters. The Bike Station also will bring more people to the paths along the rivers which will be an impetus for community involvement with the continual preservation and improvement of these natural habitats. Financially, the Bike Station will eventually lead to a reduced number of cars in the city, and a greater number of people coming to the city, thus allowing for more dense development where there is currently an over abundance of surface parking.

¹ McDonough, William. Cradle to Cradle.

CONTEXT

Context of the City of Denver:



Figure 1: Evening view of the City of Denver looking west towards the Rocky Mountains.

Denver has grown into a sprawling metropolitan area which has begun to encroach upon the foothills to the west and is no longer clearly differentiated from its neighbors, Colorado Springs to the south, and Boulder, to the north (Figure 2). Colorado has a population of 4,016,306 residents. Over 2.3 million of those residents reside in the Denver metropolitan area. All of Colorado is experiencing a population boom with over 700,000 people moving to the state in the last decade, and the population of Denver rising by 23% since 1990² (Figure 3). By 2020, Denver's population is forecast to increase by 132,000 people.³ The Denver metropolitan area is still growing more quickly than the surrounding natural resources can sustain, but with the recent attention refocused on the

²Denver Metro Convention and Visitor's Bureau: <http://www.denver.org>

³ Blueprint Denver, CD-Rom

downtown districts of the city, the sprawling region is slowly creating a clear nucleus for itself and reviving interest in living in the city. In order to maintain the quality of life which attracts people to the region, Denver must be concerned about growth and its impacts on the city, the region, the Front Range and Colorado as a whole.⁴

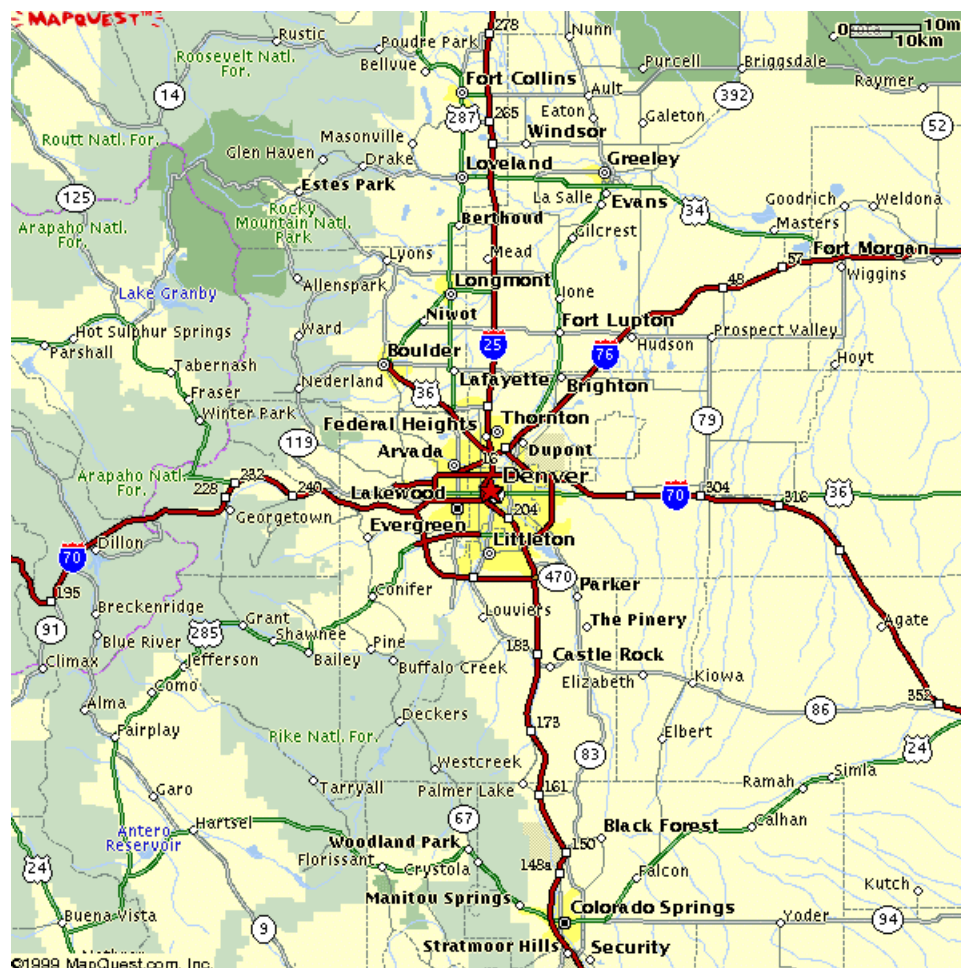


Figure 2: Denver and its surrounding region: Denver is located along the Front Range, immediately to the east of the Rocky Mountains, on the western edge of the Great Plains.⁵

⁴ Blueprint Denver CD-ROM

⁵ www.mapquest.com

Population Growth in the 1990s

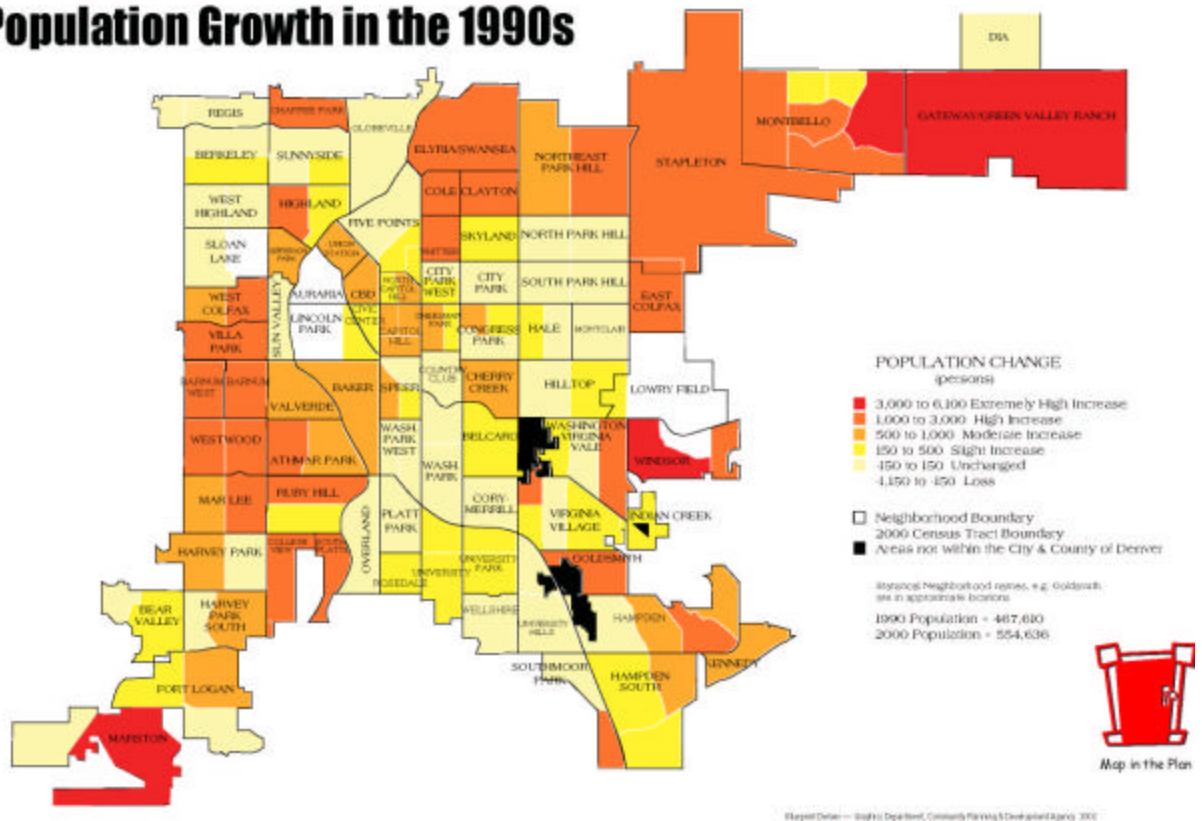


Figure 3: Population Growth in the City of Denver in the 1990's. The greatest increase has been in new suburban developments located on the edges of the city limits, but there has also been a significant increase in some of the centrally located, historic neighborhoods.⁶

⁶ Blueprint Denver CD-ROM

History of the City of Denver:

It is important to investigate what makes up the character and nature of the city in order to be able to eventually create a meaningful structure that is truly appropriate for its place. The history of Denver, though still young, can offer insights into the general character of the city and the culture of its residents.



Figure 4: Historic aerial view of downtown Denver, looking down 16th Street to the northwest towards the South Platte River.⁷

⁷ www.archives.state.co.us/archist.html

Denver is still a young city as it is not yet 150 years old. General William Larimer officially founded Denver in 1858 at the confluence of the Cherry Creek and the South Platte River (the approximate location for the building proposed in this thesis.) Denver's early days could be characterized by a sense of independence, pursuit of quick wealth (mining) and a frontier mentality questing for adventure.

“In the South Platte Valley, the new way of life stamped the instant city as antithesis of the wilderness. Their builders, men and women seeking sudden riches, destroyed whatever stood in their way and assured the independent beginnings of Denver. Their single-minded pursuit of their goal produced cities in isolated settings which magnified the hectic pulse of urban life. The heritage of their reckless and tenacious chase of gold marked the cities, and these, in turn, shaped their people.” (Barth, pp. 126)

Denver can still be characterized by the above quote. The gold rush and the silver rushes of the late 1800s were the catalysts for growth in Denver's early days. Today, Denver is still growing at a remarkable rate, but today's “rush” is driven by technology companies, attractions to the general attitude of the city, and a desire to live closer to nature, without completely abandoning the city. The desire to live closer to nature has also led to an enormous problem with sprawl encroaching further and further into both the mountains and the expanses of the Great Plains.

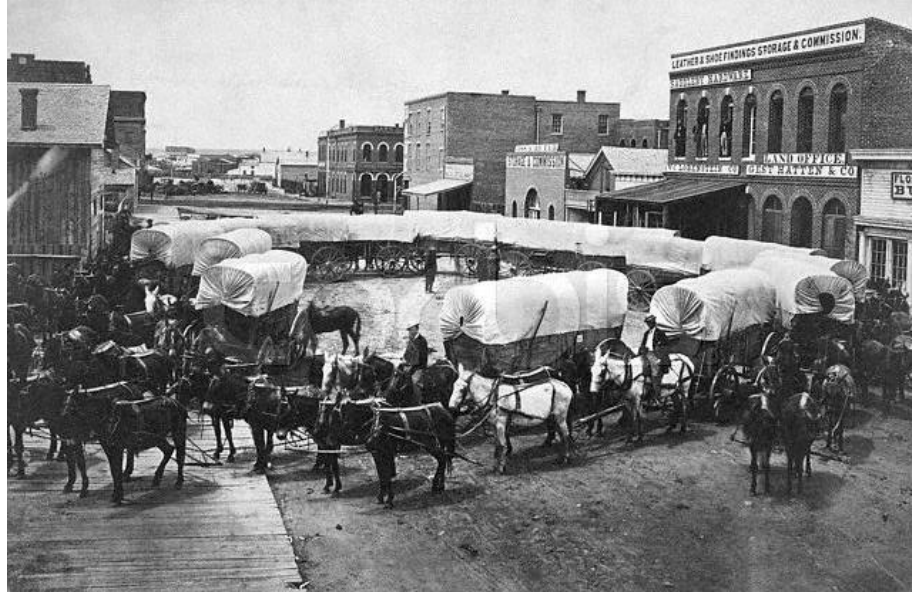


Figure 5: Original settlers in Denver.⁸

The original city grid of Denver was laid out perpendicularly, in relation to the South Platte River and the Cherry Creek (Figure 6). This old grid still makes up the area which is generally considered to be “downtown.” Lower Downtown (LoDo) is the northwestern portion of this district, closest to the water, down the slight hill from where the capitol building is situated. The South Platte is not a navigable river, and the Cherry Creek is not a creek which connects to any significant location. Compared to the lush, fertile earth in the eastern United States, Denver lacked the standard prerequisites for urban greatness. It was founded on a virtual wasteland, the ground was too hard and dry to easily farm, and the only water sources were fairly insignificant. Despite these conditions, the early residents of Denver were determined to make their city prevail. The city fabric surrounding the original street layout of Denver represents a continuation of the 1785 square mile grid of the United States which was mapped out across the entire country.

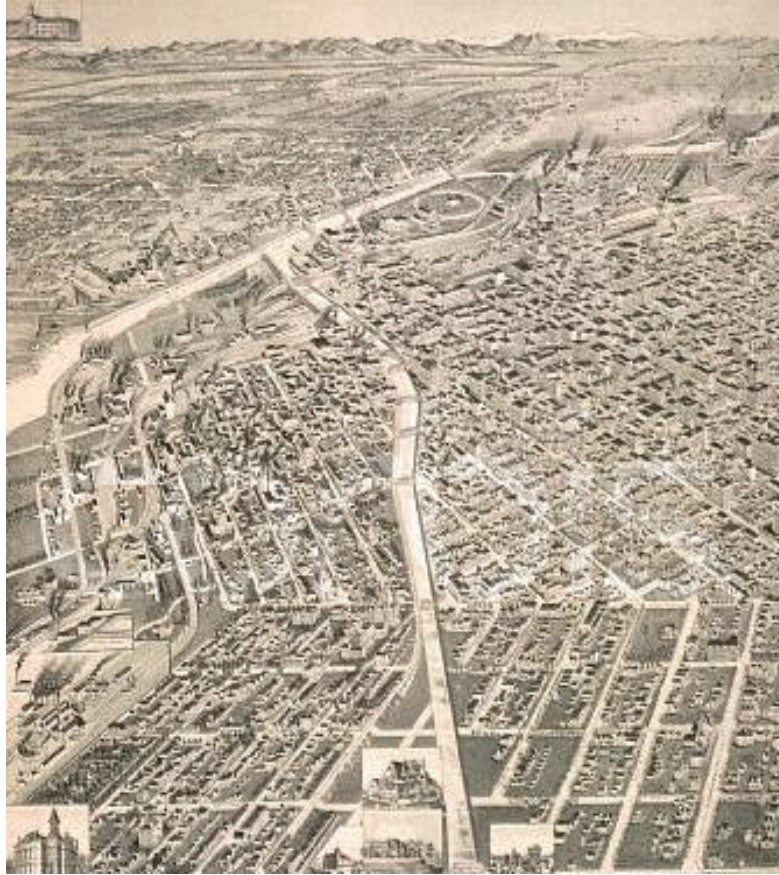


Figure 6: Historic Map of Denver showing the confluence of the Cherry Creek and the South Platte River. The original city grid is aligned with the rivers, the later grid which corresponds to the 1785 grid that was imposed over the entire nation can be seen to the South.⁹

Denver was officially named after the governor of the Kansas Territory, James Denver, after the “Pike’s Peak Gold Rush” of 1858 brought gold seekers to Colorado. During the 1860’s, there was a slight stagnation of mining, but in the 1870’s, silver was found, and once again people flocked to Colorado. Denver’s population increased explosively, from 4,759 in 1870 to 133,859 in 1890, a faster rate than in any other city in the country at that time. These early settlers were a rather diverse group, but they were all determined to strike it rich, whether by way of the mines or by way of the city.

⁸ Image from: <http://www.corbis.com>

⁹ Image from: <http://www.corbis.com>

Because of the nature of its settlers, Denver was never really originally planned out. Buildings were put up quickly, just as they were in the nearby mining camps, where people went to make a fortune quickly, but did not intend to settle. In his history of the development of Denver, Thomas J. Noel explains, “Denver grew up fast and recklessly. With each new boom, the town tore down buildings to replace them with bigger ones. Jerome Smiley noted this propensity for trashing the past in his 1901 History of Denver: ‘Although Denver is but little more than forty years old, nearly all the buildings that constituted the pioneer town have disappeared.’”¹⁰

Like Many other American cities after World War II, Denver had become a city characterized by its sprawling suburbs and desolate downtown. During the post World War II era, the Denver Urban Renewal Authority continued the early tradition of destroying the urban fabric in the name of a new, bigger and better idea. They were responsible for the demolition of much of the urban core in order to create numerous surface parking lots and unused urban plazas. Before World War II, Denver represented 72 percent of the region’s Population, now only 23 percent of the region’s population lives in Denver, and just 34% of the region’s jobs are found in Denver.¹¹ Today, many districts of Denver are in the process of being actively revitalized. There is added interest in establishing mass transit infrastructure and re-evaluating the allocation of land-use throughout the city. The development in the downtown area has been focused on re-establishing a dense urban core with many infill projects and adaptive reuse of industrial buildings. While there are still many surface parking lots, the value of the real estate is

¹⁰ Noel, Thomas J. Mile High City. http://www.denvergov.org/AboutDenver/history_narrative_8.asp

¹¹

increasing at such a rate that it will soon no longer be economically viable for many of them to exist.

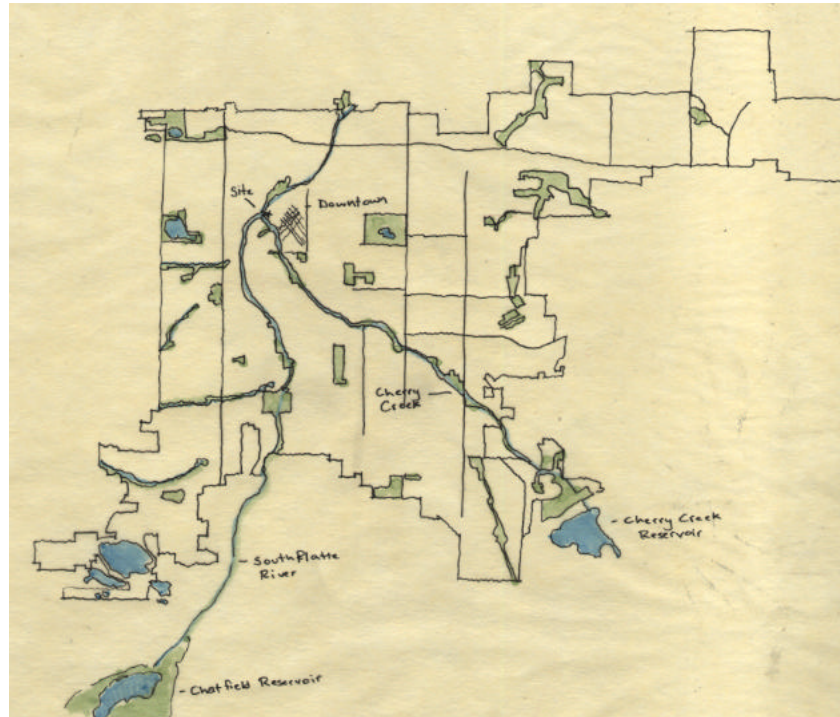


Figure 7: Diagram showing the South Platte River and Cherry Creek in the context of the city. Additional significant city parks are noted.



Figure 8: Figure Ground diagram of the area surrounding site. The areas along the South Platte River are empty, showing clearly the city's tendency to pull away from the river because historically, the river was home only to industrial plants and warehouses because of flooding concerns.



Figure 9: Figure ground of site in the context of the proposed development of the Commons neighborhood, located south of the South Platte River, extending to Union Station.

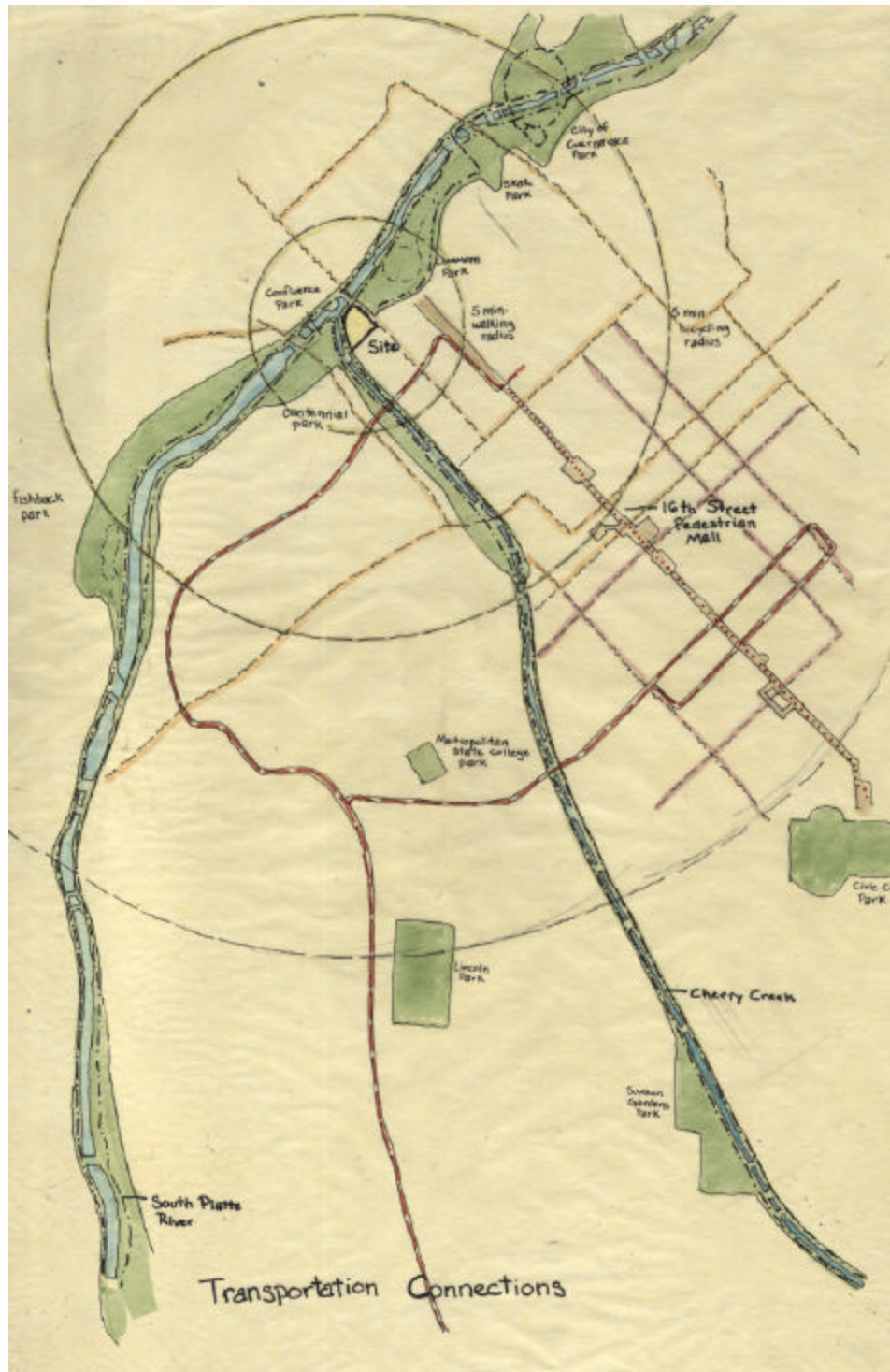







Figure 10: Diagram showing transportation connections. Bike trails extend along the water ways and connect to on-street bicycle routes in the downtown area, the light rail and city bus routes.



Figure 11: Diagram showing the significant cultural attractions located in the immediate context. The site is located less than a 10-minute bicycle ride from the city's three professional sports venues, Elitch's Six Flags Amusement Park, the Denver Performing Arts Complex, numerous museums and galleries and Auraria campus, home to 3 higher learning institutions.

The Current Plan for the Future: Blueprint Denver:

Denver, like many American cities changed considerably throughout the twentieth century. In the year 2000, the city published a plan, Blueprint Denver, which outlines the plan which the city would like to adopt for the next 20 years (Figure 18). The plan has not yet fully been adopted and put into action, partially because it requires the changing of zoning ordinances in many cases, which may take a long time. The following are the main tenets of the Blueprint Denver Plan:

- Extent of urban development**  Denver established an urban growth boundary for Denver and has adhered to it. Blueprint Denver identifies areas within its boundaries that are appropriate for new development. (Figure 9)
- Open space**  Denver is committed to maintaining and continuing to acquire open space that helps shape the region's form, protects environmental resources and provides recreational opportunities. (Figure 11)
- Balanced, multi-modal transportation system**  This is a key tenet of Blueprint Denver that will be achieved in a variety of ways, including through an emphasis on creating and enhancing multi-modal streets and endorsing the completion of the rapid transit system. (Figure 12)
- Urban centers**  Blueprint Denver calls for improving and adding new centers to create vibrant urban areas that serve not only Denver neighborhoods, but also the region. Downtown and Cherry Creek are Denver's centers with the greatest regional draw.
- Environmental quality**  Blueprint Denver also acknowledges that “the location, type of growth and land development have significant effects on the region's air and water quality” and strives to create transportation options and sustainable development

The project proposed by this thesis will work with the Blueprint Denver plan by providing a sustainable building that will accommodate multi-modal transportation, preserve open space, and respond directly to concerns about the region's environmental quality.

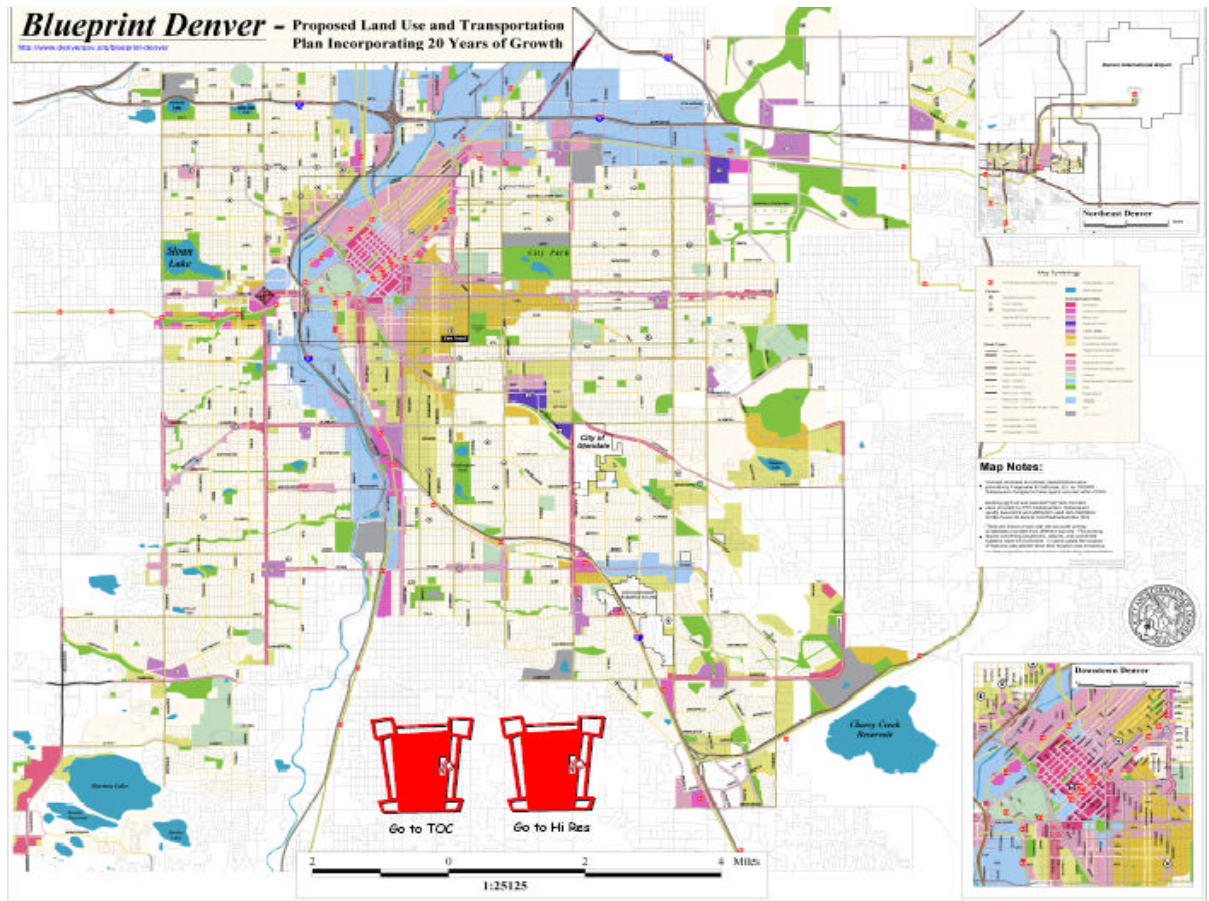


Figure 12: The Blueprint Denver master recommendation plan for the next 20 years. The plan takes into consideration suggested zoning changes, transportation enhancements and the creation of well defined nodes to be developed.¹²

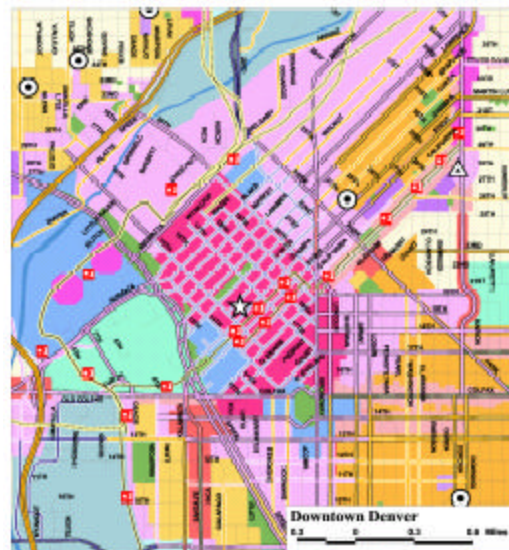


Figure 13: The Blueprint Denver map, zoned in on the downtown area.¹³

¹² Blueprint Denver CD-ROM

Neighborhood Context:

The site of the proposed project is located adjacent to one of the most rapidly growing areas in downtown Denver, a district referred to as “LoDo,” short for Lower Downtown. It is important to understand and be able to work with the primary principles of the LoDo plan, as it has successfully brought life back into the city. LoDo has become a fairly well defined district anchored by the historic train station, Union Station. LoDo, the site of some of the earliest settlements in Denver, had become home to abandoned warehouses and unused viaducts, where the average person never dared to venture. During the past 20 years, the city has slowly re-centered itself in LoDo, revitalizing what was once the original foundation of the city, creating a lively district. Now, LoDo has become a completely mixed-use district, built at a pedestrian friendly scale, and seamlessly knitted into the city’s fabric.

¹³ Ibid.

The LoDo Development Plan:



Figure 14: The historic context of the LoDo area has been preserved, enhanced by new additions and re-used in creative ways.¹⁴

During the 1960s and 1970s, almost one fifth of the historic buildings in the Lower Downtown district were destroyed under the guise of urban renewal. This historic district had become Skid Row, virtually abandoned by normal city life, and taken over by warehouses, missions, and seedy establishments. Its downfall began after the Silver Bust of 1893, and it wasn't until the late 1980's, nearly 100 years later, that this central district of Denver was finally revived. In 1982, the Denver Business Improvement District was formed as the 16th Street Mall Management District. 16th Street Mall (Figure 19) was opened as a pedestrian only street, leading from the city's civic center down to Union

¹⁴ The LoDo Neighborhood Plan

Station as an attempt to attract people back to the city. They boasted free shuttle bus service which was the only motor vehicle along the 16 block long pedestrian street.



Figure 15: View of the 16th Street Pedestrian Mall on a snowy winter evening. The street is closed to all vehicles except for free, electric buses which run the length of the mall, from Union Station to Civic Center Park, all day long.



Figure 16: View of the 16th Street Pedestrian Mall on a summer day.

In 1974, LoDo's zoning was changed from I-1 industrial zoning to B-7 mixed-use zoning. In 1986, the first Downtown area plan was produced, and in 1987 an Urban Design Plan specifically for Lower Downtown was developed. In the following five years, the zoning was continuously revised and clear design guidelines were set. It achieved official Historic District status in 1988. The vision for LoDo focuses around the following principles:

- Preservation of the historic buildings and historic character of the District
- Creation of a mixed use neighborhood, incorporating housing, retail, light industrial, office and entertainment uses
- Stabilization of the real estate markets
- Redevelopment of a pedestrian friendly streetscape
- Improved transit and access
- A sense of place

One of the main goals was to strike a balance between preserving the historic character and encouraging appropriate growth. Using the principles stated above, the district has grown to be a center for urban living in its numerous loft apartments, and the major district for art galleries, restaurants, and professional sports. In March 1995, the Lower Downtown District, Inc. (LDDI) secured grants from the state historical fund and the downtown Denver Business Improvement District, which was renewed and expanded to its current 120 block boundaries in 1992.

The Neighborhood Plan is divided into five sections: Historic Preservation, Design of New Buildings, Uses, Mobility and Parking, and Streetscape. The plan clearly defines all of the terms around which it sets its regulations and then explains and gives

examples of how to design accordingly. For example, the plan evaluated the successful historic buildings which were still standing, and then determined what aspects of these buildings made them so successful. The plan then states that all new buildings must have facades with a clear sense of division, i.e. an articulated top, a clear middle with appropriately proportioned windows and a base rich in architectural detailing. They do not dictate a style for new buildings, therefore, there are many very modern buildings, which do not mimic the old style, but they fit in because they follow the massing and proportioning suggestions. Keeping buildings at human scale, adding street furniture, public art and accommodating bicycle traffic all help to keep the streets user friendly.

LoDo is made up of blocks which are 266 by 400 feet, arranged in the regular grid that was the historic foundation of the city. The district contains clear street hierarchies. There are alleys which bisect the blocks lengthwise, tertiary streets which mostly are the named streets, secondary streets which are usually numbered and then primary streets defined as highways which connect to the district but do not enter it. LoDo has clear natural edges created on two sides by the Cherry Creek and the South Platte River, and then is bordered by a primary road, Speer Blvd., and Coors Field, on the other two sides. The site for the proposed Alternative Transportation Center is located on LoDo's northern most edge, adjacent to the confluence of the Cherry Creek and the South Platte River.

The development of the LoDo Historical District was spurred by the opening of Coors Field in 1995, the baseball stadium which serves as the home of the Colorado

Rockies (Figure 17). Coors Field acts as an anchor in the LoDo district and thus, immediately brought lots of interest and financing to the developing area. Now, there is a close connection to a new professional football stadium, a new professional basketball arena and Elitch's Gardens, a historic amusement park, built during the City Beautiful Movement, but recently relocated to its current, more central location.



Figure 17: Coors Field, located on the eastern edge of the official LoDo district, opened in 1995 and has become an extremely popular destination, drawing people to the entire district on a consistent basis ever since it's opening.



Figure 18: Market Street in LoDo on a summer afternoon.



Figure 19: View of 15th Street in LoDo. The district has been very successful in rehabilitating the old buildings and infilling with appropriately contextual new construction.



Figure 20: View of the buildings of Wazee Street, across from Union Station in LoDo.



Figure 21: Photographs of some historic LoDo buildings.¹⁵

¹⁵ Images from: hewit.unco.edu/dohist/vftrips/colocity/lodo/four.htm



Figure 22: View of the Tivoli historic brewery building located on the Auraria campus, home to the University of Colorado at Denver, the Metropolitan State College of Denver and the Community College of Denver. The new Invesco Field at Mile High professional football stadium can also be seen in the background.¹⁶

There is also Auraria campus, an urban university complex serving 30,000 students, built in 1977 as the result of urban renewal. All of these serve as major nodes of the entire region. They give people a clear purpose for coming back to the city, and then once they arrive, they discover that Denver has matured a great deal in the past 15 years.

Union Station:

Union Station, the historic train station, and its role in shaping the city are important to take into consideration when developing plans for the proposed transit center. The proposed site is located on what used to be an expansive area of train yards. The station is currently in the process of developing a master plan for the future which will once again revitalize the station as the transportation hub of the city. Because the project proposed by this thesis is also a transportation facility, it will inevitably need to be connected to Union Station, physically as well as ideologically.



Figure 23: Union Station's connection to the Union Pacific Railway in Cheyenne, Wyoming was vital to the success of Denver as a city.

This historic train station was originally vital to Denver's existence as a city and has since been a solid cornerstone of the community. In 1870, John Evans linked Denver to Cheyenne, connecting to the Union Pacific Railroad which ran through Cheyenne and was vital for the city's existence. Union Station was first built in 1881, then rebuilt in

¹⁶ Image from: www-math.cudenver.edu/IMACS03/transportation.html

1894 after a disastrous fire. Following the World Columbian Exhibition of 1893 in Chicago, Denver embraced the City Beautiful Movement. In 1904, the capitol building, along with its sprawling lawn and Civic Center complex, was built at the end of the axis leading up from Union Station. Throughout the years, Union Station has retained its status as a city landmark, even throughout the years when its surrounding neighborhood was essentially deserted.

The Proposed site is north of Union Station. The area where the site is located had previously been train yards and a sort of industrial wasteland. Union Station is undergoing fairly dramatic renovations which call for placing all of the existing rail lines underground at the station. The station will also be made into a self-proclaimed multi-modal station, which refers to the multiple transit options to be housed there: Amtrak passenger trains, Greyhound buses, the local 16th St. Mall free bus, regular city buses, and light rail.



Figure 24: The historic Union Station today.

Natural Context: South Platte River Valley Corridor:

An understanding of the region's climate is necessary for beginning to develop an appropriate response to its environment. Denver's location just to the east of the Rocky Mountains and far from any major moisture source results in a mild and arid climate. The city receives only 8-15 inches of precipitation a year and has over 300 days of sunshine a year -- more annual hours of sun than San Diego or Miami experience. Winters are mild with an average daily high of 45 degrees Fahrenheit and snow usually melts within a few days of falling. Chinook winds, warm winds which blow down from a mountain and gain heat as they lose elevation, can bring warm weather to Denver at any time throughout the winter. During the summer, the arid climate is easily mediated by natural air conditioning such as appropriate ventilation and evaporative cooling.

The soil along the Front Range is generally either characterized as sand or clay. Clay soil is dense, and is slow to absorb and release water. When there is a lot of water, it either pools on the surface or runs off. Therefore, an excess of water can cause plants in clay soil to drown. Sandy soil, on the other hand, doesn't hold water, so plants must be irrigated frequently to prevent drying out.



Figure 25: Historic view of the South Platte River waterfront.

The proposed site is located along the South Platte River. Through metro Denver, the river flows in a narrow corridor, contained by flood control efforts. The source of the river is melted snow run-off from the mountains to the southwest. The stretch of the river which runs through downtown Denver had been largely surrounded by junk yards, railroads and warehouses for most of the past century. The Platte had become a dumping ground for industrial waste and trash, nearly eradicating the native ecosystems of the river. Since 1974, the Greenway Foundation¹⁷, a non profit organization founded to resurrect and preserve the river, along with the South Platte River Commission have been instrumental in changing the city's attitude toward the river, resulting in a thorough transformation of the river corridor. Today, the entire length of the South Platte River through the city is lined with a continuous greenway, including extensive bike paths, landscaping and a series of parks. The river itself has been cleaned and dredged with a deep new channel that prohibits flooding.

When considering development along any natural corridor, it is important to understand the implications that any development might have on the natural environment. The South Platte River corridor is a recognized habitat for many birds and waterfowl. A large number of ducks and geese winter along the river, along with a smaller number of various species of hawks, falcons and eagles. The predominant vegetation along the river consists of elms, cottonwoods, patches of willows and various native grasses.¹⁸ Heavy use by pedestrians and bicyclists often disrupts these natural habitats, therefore, a solution

¹⁷ www.GreenwayFoundation.org

¹⁸ http://www.auboncolorado.org/IBA/south_platte.htm

that disrupts as little as possible would be the most advantageous to the natural environment when planning for future development and use.



Figure 26: View of the South Platte River at Confluence Park taken from the plaza in front of REI. The Cherry Creek can be seen joining the South Platte on the left side of the photograph. The river has been enormously cleaned up during the past 20 years. This portion of the river is used by kayakers, practicing navigating small rapids.¹⁹

SITE

The site for the proposed Alternative Transportation Center is located at the confluence of the South Platte River and Cherry Creek. The site lies between Confluence Park and Commons Park. Commons Park was created within the past 2 years directly to the north of Union Station on the banks of the South Platte River. The site is the former location of the Platte Substation, the site was cleared of the utility towers and transformers in May 2003²⁰, liberating the site to be developed as a park along the Platte River Greenway. There is a series of parks along the South Platte River which intentionally create more inhabitable space at the water's edge, thus reclaiming the river from its previous inhumane industrial inhabitants.



Figure 27: Proposed site located at the confluence of the South Platte River and Cherry Creek.

¹⁹ Image from: www.brunerfoundation.org/p/2001-sp.html

²⁰ The City and County of Denver: South Platte River Initiative:
http://www.denvergov.org/South_Platte_River/template37077.asp

Denver Mayor Wellington Webb designated 1996 as The Year of the Platte River, and created the South River Corridor Project. Through the efforts of Mayor Webb and numerous volunteers, the once neglected river is restored to a 10.5 mile corridor scenic stretch ideal for biking, running or walking. Commons Park, adjacent to the proposed site, was added to the riverfront parks in Summer 2000 and is considered the jewel in the crown, of the open space system. ²¹



Figure 28: View of Commons Park, adjacent to the proposed site, along with the South Platte River and the contextual buildings located across the river to the northwest of the site.

²¹ Ibid.



Figure 29: View of Confluence Park, located at the confluence of the South Platte River and the Cherry Creek. This is one of the few navigable portions of the South Platte River through Denver.

Along both the South Platte River and the Cherry Creek are existing greenways with bicycle trails which lead southeast and southwest, respectively, through the city to the Cherry Creek Reservoir and Chatfield Reservoir, connecting to various additional cross-town trails along the way. Both paths are well used by cyclists, skaters, and pedestrians at all times during the day, all year long. They serve as direct connections from the city to the wilderness and vice versa. They provide natural habitats running directly through the city which create a haven from the surrounding urban context. The river corridors also both serve an important function as wetlands, providing a natural refuge in the city for migrating waterfowl.

The Wrong Side of the Tracks:

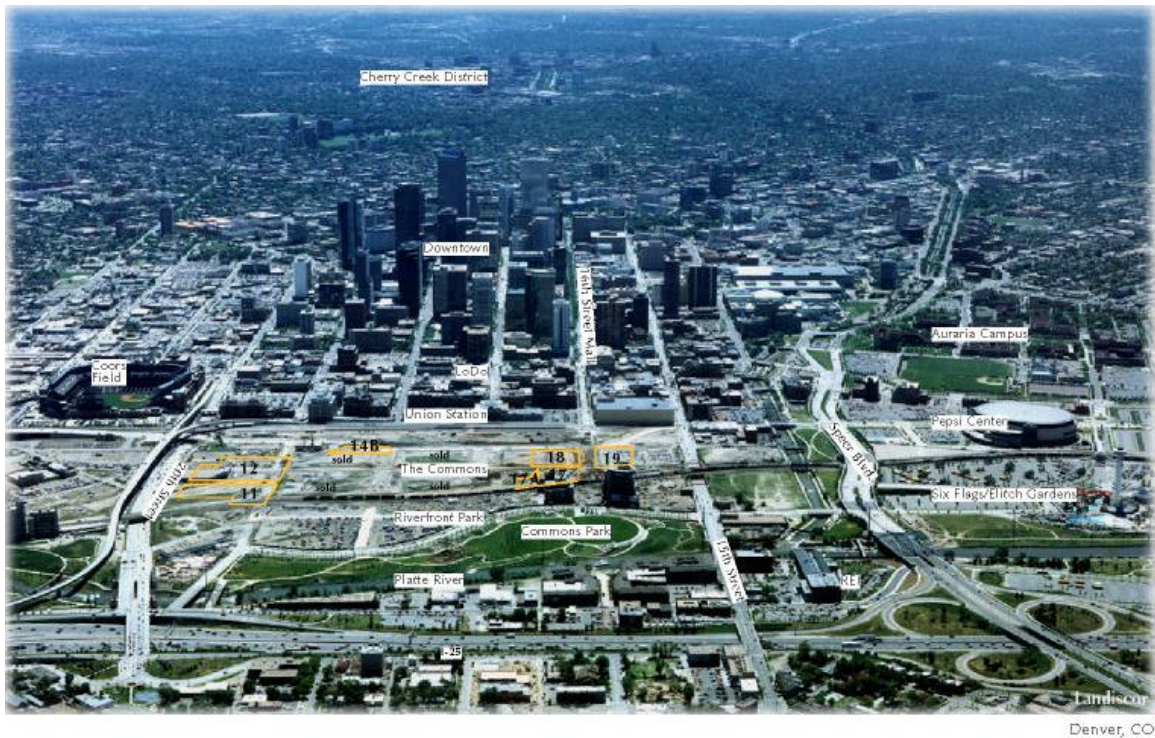


Figure 30: The Commons Area is shown here in relation to downtown Denver. The photograph is looking southeast. The area between Commons Park and Union Station is currently under construction.

The Commons (Figure 30), the latest upscale city development is in an unexpected location. The entire Commons development is located in an area that had always been thought of as “the wrong side of the tracks,” and there were good reasons for that label. The entire site, including the adjacent area, all the way to Union Station, is located on the flood plain. Denver has experienced a handful of disastrous floods, which were the original impetus for moving development further from the edge of the river. There have not been any substantial floods since a disastrous flash flood in 1965, a 20’ wall of water barreled through town, leveling homes.²² Chatfield Reservoir, located at the south end of the Platte River bicycle trail, was built to protect the city from flooding

²²Briggs, Bill and Elana Ashanti Jefferson. “Riverfront Revival.” The Denver Post, June 16, 2002.

of the Platte River. In recent years, the entire region has faced such severe drought that the water level has been dangerously low.

On the other hand, the site is notable because it has been a successful redevelopment of a brownfield area. The City of Denver has been highly successful in undertaking brownfield redevelopment efforts along the Platte River. The EPA has even designated Denver as a 'Brownfields Showcase Community' to serve as an example for other cities to follow. The entire area behind Union Station reaching to the edge of the river had been the home of train yards, warehouses, and large industrial fields (partially as mentioned above, because of their location in the flood plain). Denver began to focus on cleaning up the brownfields along the river in the 1980's. The land was contaminated with landfill byproducts, radioactive material from radium processing sites, and residue from railroad yard maintenance facilities.²³ The clean up results have made it possible for all of the new cultural facilities which are located along the river in downtown to be built: Six Flags Elitch Gardens Amusement Park, the Colorado Oceans Journey Aquarium, Coors Field, the Pepsi Center Arena (home of the Colorado Avalanche and Denver Nuggets), and the REI Denver Flagship Store (Figure 31).

²³ Brownfields Showcase Communities, <http://www.epa.gov/brownfields/showcase.htm>



Figure 31: View from across the South Platte River of the REI, Recreational Equipment Inc., Flagship Denver store, housed in an historic 1901 Denver Tramway Powerhouse Building which is listed in the U.S. Department of the Interior's National Register of Historic Places. The store contains a 45' tall climbing wall, a -30° F cold chamber and opportunities to test mountain bikes out on a mountain bike trail, or to test kayaks out in the river.

The flagship REI store is located directly to the northwest of the proposed site, across the South Platte River. It currently is the only significant entity at this confluence of the two waterways, the two pathways and the gateway along 15th Street and Speer Boulevard to downtown Denver from the northwest. The exterior space associated with the REI building has been carefully considered and accommodates a wide variety of types of users who already come to the confluence of the two rivers in order to enjoy

being outdoors. The design proposed in this document suggests an opportunity to complete this public space centered on the confluence of the waterways.



Figure 32: View from the edge of the site towards the riverfront plaza in front of REI located directly to the north of the site.

Commons Development Plan:

The developers of Commons Park boast that as “one of the largest new parks created in Denver in decades, it has served as a catalyst in the stunning transformation of the Central Platte Valley from an industrial area into a true urban neighborhood.”²⁴ The 20-acre park, which is bordered by the South Platte River, 15th Street, 19th Street and Little Raven Street, is the result of many years of collaboration between the public and private sectors. The park and the adjacent Commons development (Figures 33-35), which is in the early stages of construction has created a strong link between the traditional Downtown business district, Lower Downtown and the developing Central Platte Valley.



Figure 33: Aerial view of Commons Park and the South Platte River.

²⁴ Cox, Jack. “Historic Buildings in Commons Park.” *The Denver Post*, June 16, 2002, accessed online: www.denverpost.com/media/paper36/June2002/0616mapcolor.jpg



Figure 34: Detailed master plan of the Commons development.

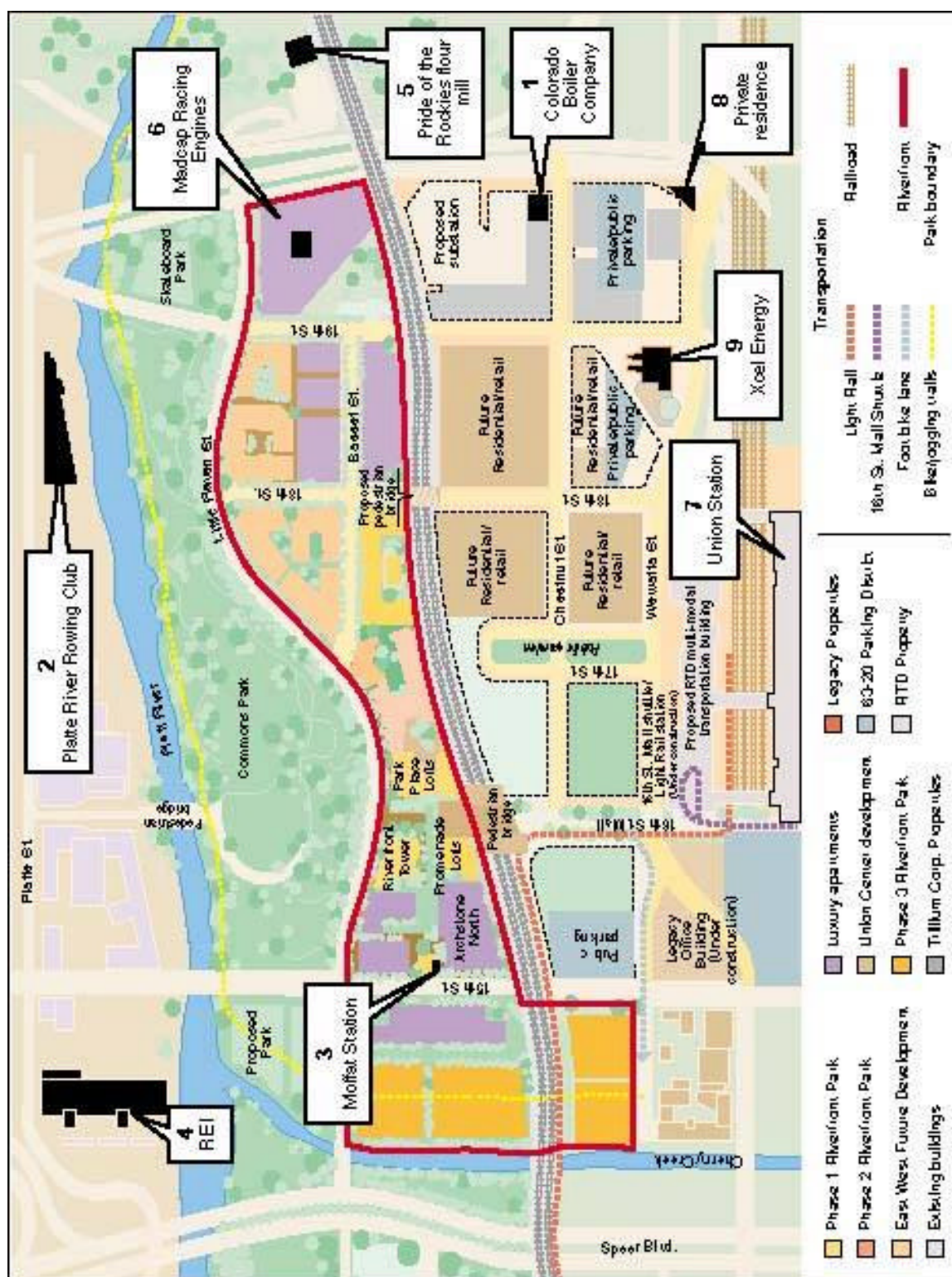


Figure 35: The Commons area development plan, showing basic zoning, historic structures, and transportation routes.

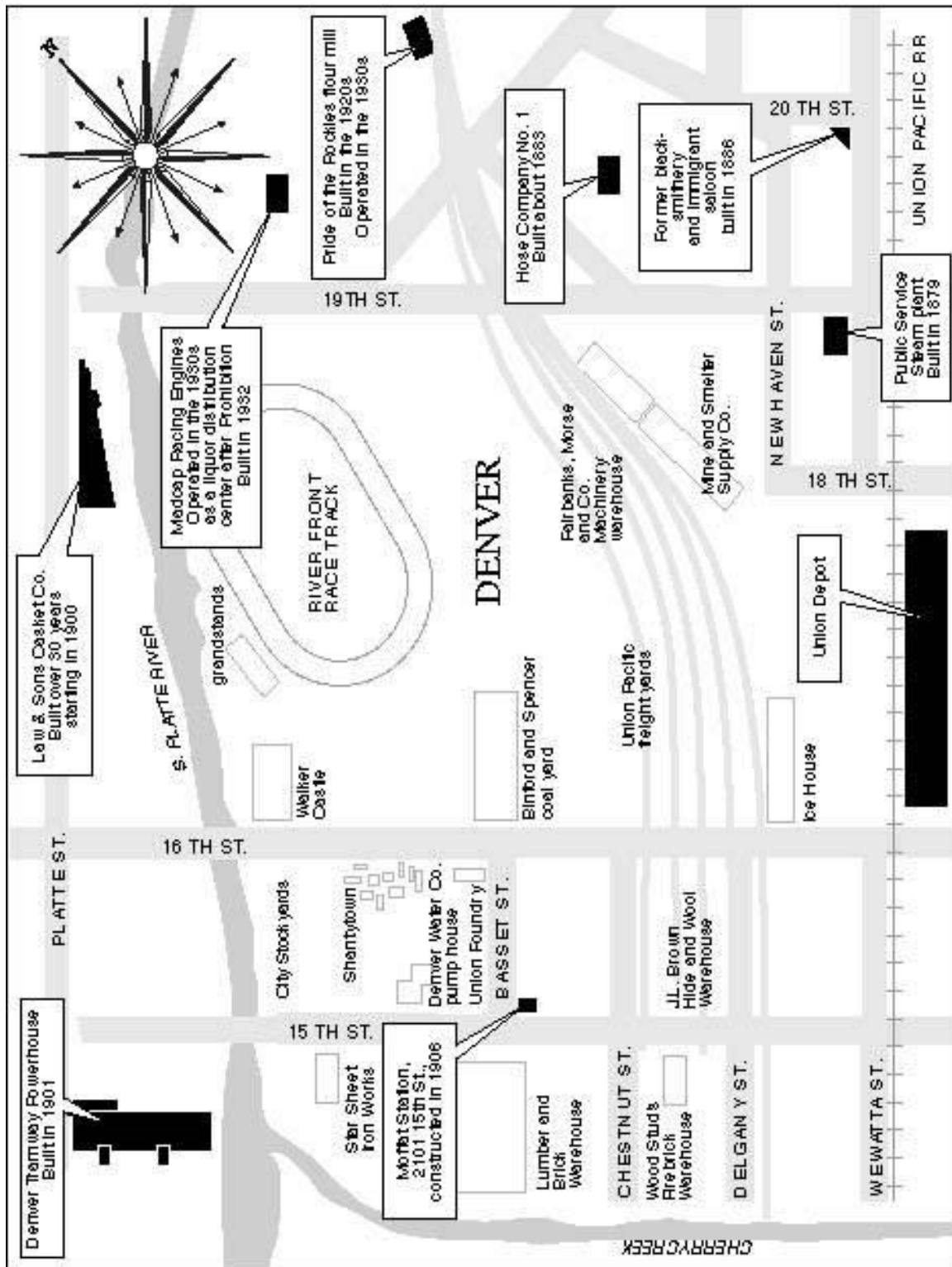


Figure 36: Historic map of the Commons area, circa 1935. The historic structures in black are still standing, the majority of them have been adapted and are now re-used in a new way.

The Commons development plan is significant to the scope of this project in that it not only creates the urban context for which this proposal will fit into, but that it also becomes a direct continuation of the urban fabric of the downtown area of Denver. The plan extends the 16th Street pedestrian mall all the way to Commons Park at the South Platte River, creating a landmark pedestrian bridge over the existing freight train tracks. This creates significant public spaces lined by housing, offices and retail extending all the way to the river. This also creates a clear connection for any possible bicycle commuters who would be passing through the project proposed here and ultimately ending up on foot or on public transit in the city.



Figure 37: Commons Plaza is a public open space, recently built along with some of the Commons loft apartment buildings. When finished, the Commons will contain 6,000 new residential units. This space is located to the northwest of Denver's Millennium bridge, both are a continuation of the 16th Street pedestrian mall.

QuickTime™ and a Graphics decompressor are needed to see this picture.

Figures 38: Denver's Millennium Bridge, a pedestrian bridge located on the northwest end of the 16th Street pedestrian mall, behind Union Station. These photographs are taken from behind Union Station, looking to the North-west.



Figure 39: Denver's Millennium bridge not only bridges the railroad tracks to allow for pedestrian passage all the way to the water, but creates significant inhabitable space at a second level and remarkable panoramic views of both the mountains and the city.



Figure 40: View of some of the first few mixed use buildings to be built in the Commons, located directly south of Common's Park.

SITE STRATEGIES

The proposed site is at the hub of several different conditions and must somehow reconcile or at least address these conditions.



Figure 41: Figure ground of the proposed neighborhood context surrounding the site. The Commons neighborhood, located to the north of Union Station and south of the South Platte River, is currently in the process of being developed. The context to the southwest of the site is composed primarily of large institutional entities; Elitch's Gardens Amusement Park, Auraria Campus and Pepsi Center Arena.

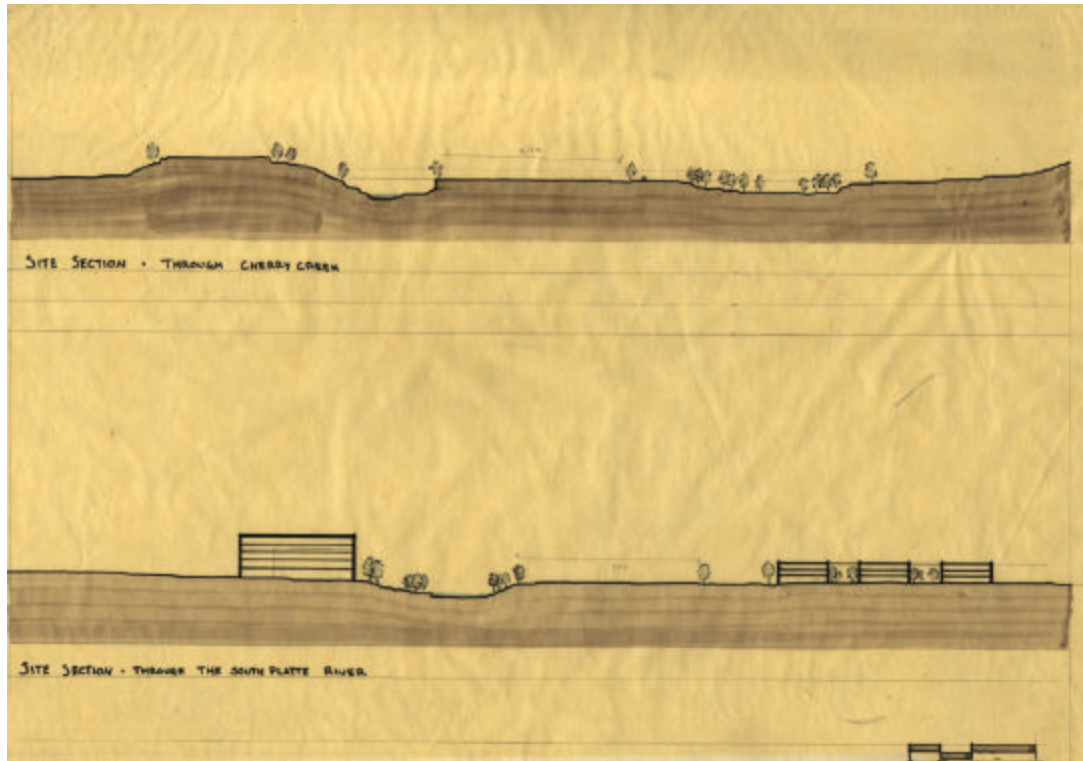


Figure 42: Sections through site and adjacent context. Denver is located on fairly flat ground, but the topography of the rivers' banks provide opportunities for exploring this edge.

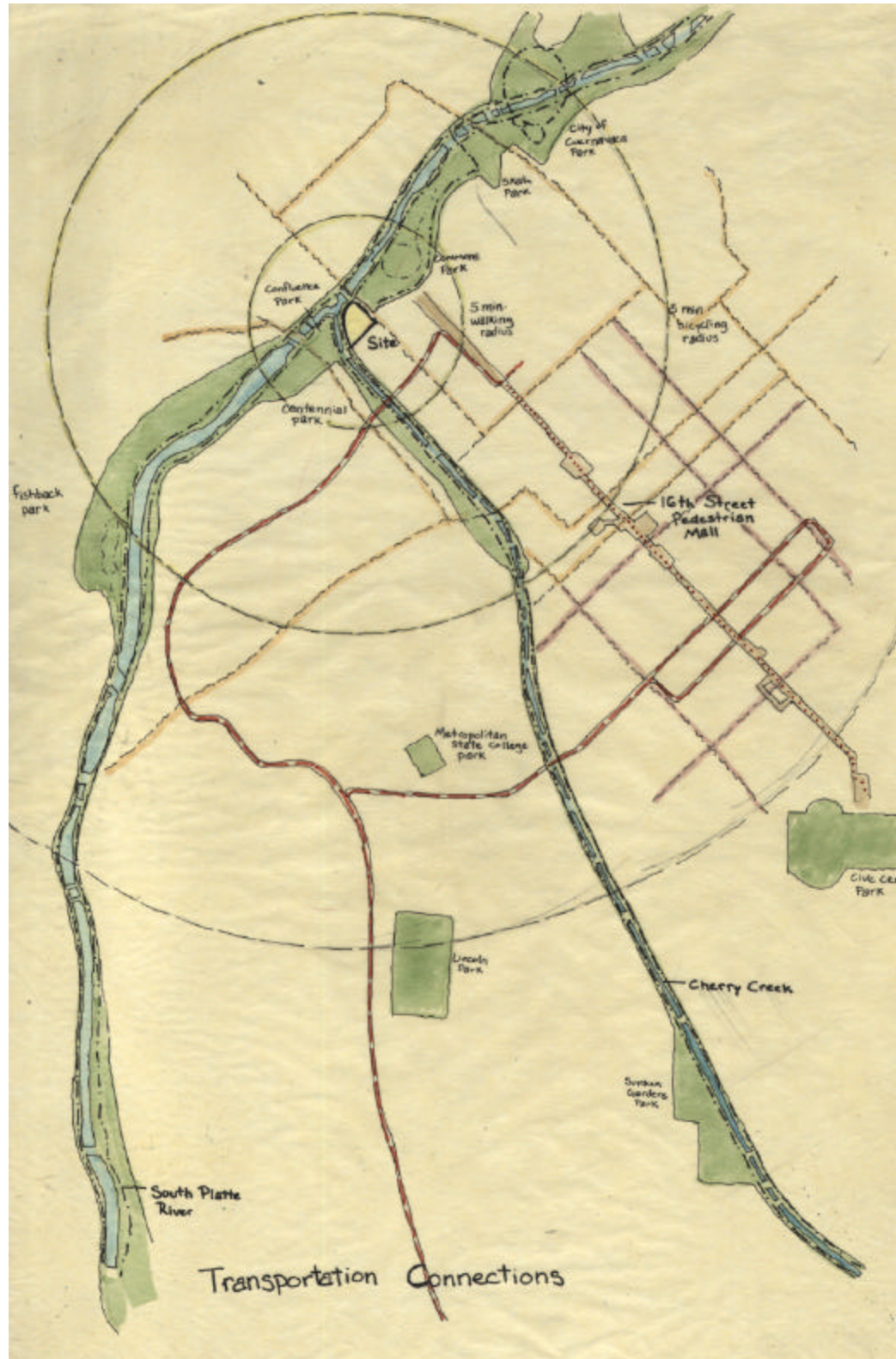


Figure 43: The site and its connections to the surrounding area. The site is located at the confluence of the two main bike trails which run through the city, they then connect to on street designated bike routes, the light rail line and bus routes.

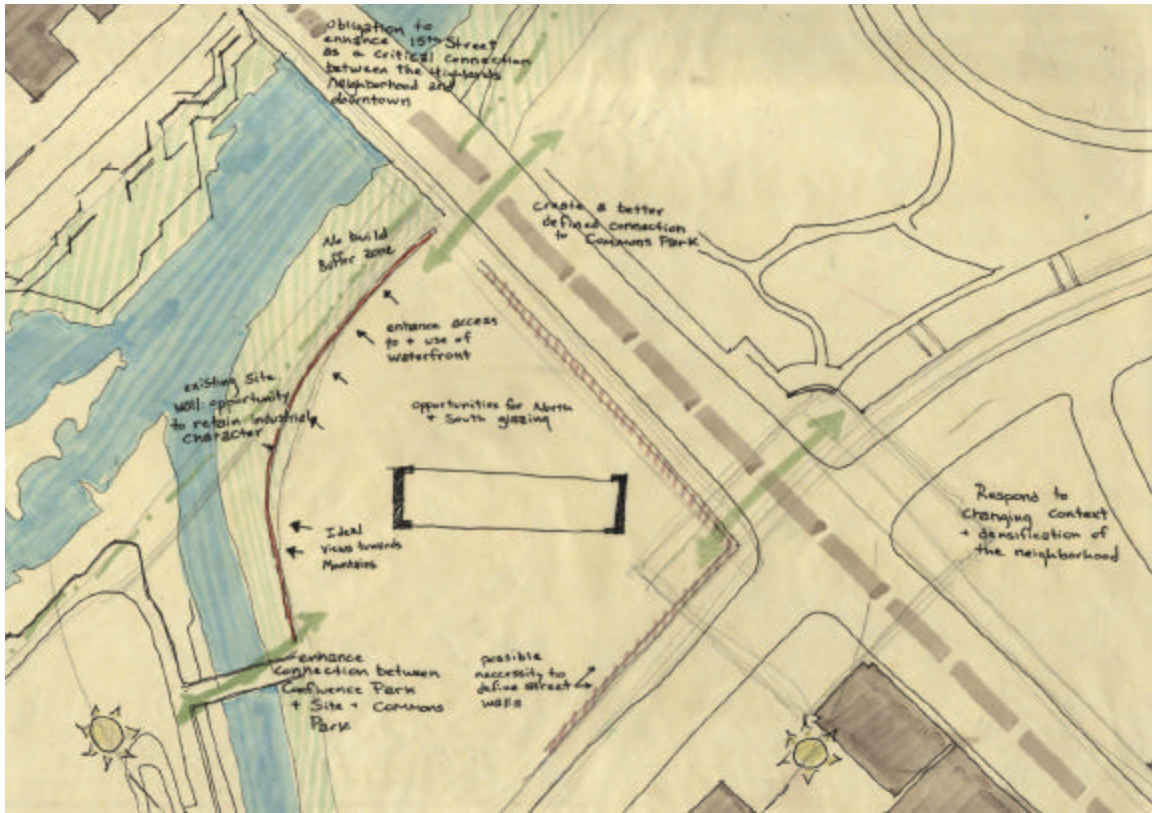


Figure 44: Diagram showing priorities to keep in mind when developing a plan for the site.

PROGRAM

The Bicycling Community in Denver:



Figure 45: Bike Lane Markings on Denver Streets.

Bicycling is a very energy efficient form of transportation and includes many benefits such as improved health, less stress, and reductions in air pollution, traffic congestion, and energy consumption. In addition, bicycles are affordable and inexpensive to maintain, and driving a bicycle is a lot more fun than sitting in traffic on a congested roadway.

The proposed Alternative Transportation Center will be a building which accommodates the needs of bicyclists and provides opportunities to use other transportation options, such as electric car sharing, electric bicycles and scooters, and bicycle pedal cabs. There are already many people who commute by bicycle in Denver and there are many more who would, if there were accommodations which made it more

of a viable option. The state government has recognized the fact that there is a large contingent of cyclists in Colorado and is involved with engineering, enforcement, education, and encouragement efforts to make bicycling a practical transportation choice.²⁵ The Colorado Department of Transportation also realizes the need for the development of facilities and programs which will accommodate a variety of safe and efficient travel options.²⁶

The Colorado Department of Transportation, Pedestrian/Bicycling Program, commissioned the Center for Research on Economic and Social Policy (CRESP) of the University of Colorado at Denver to conduct a survey on Bicycling in Colorado, the survey results and analysis were published in April 2000. The survey was intended to determine the economic role of bicycling in the state. They determined that Coloradoans are 5 times more likely than the average American to ride their bike to work. There are approximately 2.26 million residents between the ages of 16 and 55 who are employed, in a typical month 2 percent of these workers use bicycling as their primary transportation to work. An additional 5.3 percent of workers in Colorado report that riding a bicycle to work is their secondary method of commuting to work. This indicates that over 7 percent of Colorado workers sometimes ride their bicycle to work, this is nearly 160,000 people.²⁷ (Figure 46)

²⁵ Colorado Department of Transportation, Pedestrian/Bicycling Program. Bicycling and Walking in Colorado: Economic Impact and Household Survey Results. Prepared by the Center for Research on Economic and Social Policy (CRESP), University of Colorado, Denver, April 2000.

²⁶ www.dot.state.co.us/

²⁷ Colorado Department of Transportation, Pedestrian/Bicycling Program. Bicycling and Walking in Colorado: Economic Impact and Household Survey Results. Prepared by the Center for Research on Economic and Social Policy (CRESP), University of Colorado, Denver, April 2000.



Figure 46: Bike to Work Day at Civic Center Park in downtown Denver. The State of Colorado has declared every June, “Bike to Work Month”, and helps organize activities during a designated “Bike to Work Week.”²⁸ These events bring together cyclists from all over the city, some of whom bike to work on a regular basis, others who bike to work rarely. These events provide services that the proposed Transportation Center will provide: repairs/maintenance, bicycle storage, locker room facilities, food, and community gathering.

The residents of Colorado have a reputation for being active and healthy which has been verified by recent studies. According to an American Cancer Society 2002 report, Colorado is the only state in the nation in which fewer than half of the adults are overweight. The organization also cited that due to the state's high rate of physical activity, Colorado has the nation's third lowest cancer death rate. Colorado tied with Hawaii as being the least obese state in the nation, with a 14.9 percent obesity rate,

according to a survey appearing in the May 22-29, 2002 Journal of the American Medical Association.²⁹ Colorado has pleasant weather year round, and residents who live there because they enjoy taking advantage of the great weather.

²⁸ Image from: www.denvergov.org/Bicycle_Program/template34994.asp

²⁹ http://www.jeffco.org/jec_site/Pages/doingbusiness/city_county_data/city_county_profiles/rankings.html

The Function of the Building:

The proposed Alternative Transportation Center will act as both a transportation center and community center. The goal is to provide adequate services for people who want to ride their bicycles either to, from, or around the city as well as to provide alternative transportation options for all residents or visitors to the city. These options will include access to an electric car sharing program, electric scooter and electric bicycle rentals, bicycle rentals, and access to local pedal-cabs.

The transportation aspects of the building must serve commuters on a daily basis, as well as tourists, visitors to the city and recreation seekers. The center will be large enough to include the basic services needed by bicyclists which are not often provided elsewhere, as well as some of the more general services that are found in transit centers. In addition, the building will serve as a center for the surrounding community. There will be community gathering spaces, both inside and outside, including classrooms, meeting rooms, retail/commercial and café services.

The bicycle specific program may take the form of a repeatable module that could be inserted within the larger community building. This module would be a structure that includes a system for bicycle storage, locker rooms, a maintenance shop and some café services. This could provide the opportunity to propose the repetition of such a module, possibly at slightly different scales, throughout the city and region at appropriate sites along the existing and proposed pedestrian and bicycle transit corridors.

Ideally, the building would be supported primarily by the city government, with additional aid from local bike advocacy groups, cycling organizations, environmental organizations and community groups. It would seem appropriate to be able to house the business functions of some of these groups in the proposed building. The retail and commercial aspects of the building will help fund the rest of the services provided in the building.

Specific Spaces Required:

- **Alternative Transportation Accommodations:**

- **Small Garage for Shared Electric Cars : 1,000 ft²**

These cars would be part of a shared car program, there would be several locations around the city where they would be located, therefore, they would not necessarily need a large facility to house them. This garage will house approximately 8 small cars at a time. These cars would be available for hourly rentals by individuals or businesses, and could be picked up and dropped off anywhere around the city the customer prefers.

- **Bicycle Specific Facilities:**

The facilities for daily bicycling commuters will provide a smooth transition between the natural, informal world of the bike path along the river and the formal world of the city. The facilities must feel comfortable and safe, with a certain level of privacy.

- **Common Space/Meeting Area: 1,000+/- ft²**

A large gathering space is necessary, this space can be either indoors or outdoors, or both. It must provide ample sitting areas, provide shade from the sun, shelter from the rain, and access to the building's services. It needs to be able to serve the purpose of being a community gathering area,

therefore, it must have a large central area, but may also have numerous smaller areas associated with it. The reception area, café, and connection to the other side of the building must be clearly defined from this space.

- **Reception Area: 300 ft²**

This will be an area located near the main entrance on the park side. The reception area needs to be large enough to accommodate 3-4 staff members working at a time.

- **Bicycle parking for 500 bicycles: 3,000 ft² - 4,000 ft²**

- This should include an area that is entirely enclosed, but may also include an area which is somewhat open to the environment.
- No matter what form the facility takes, it must provide for protection against the following weather extremes which are possible:

water/rust issues caused by rain or snow

damage from hail, lightning

strong wind issues

extreme temperature issues

extreme sun/heat issues

- This could take on the form of individual bicycle locker areas, a parking garage with either a valet parking system or a ticket parking system

- This portion of the facility must keep all bicycles safe from vandalism, each bicycle should have its own space, or enough room around it that it will not be harmed by other bicycles and that it will not risk theft.

- There should be separate areas for rental bicycles, daily commuting clients, purely recreational day users, commercial bicycles (such as pedal-cabs) and electric rental bicycles and scooters.

- **Shower and locker room facility: 3,000 ft²**

This will include private changing and shower areas, the lockers should be substantial enough for long term storage, and storage for business clothing. These facilities should be flexible enough for persons with disabilities, anyone needing assistance and families.

- **Bicycle maintenance/service shop: 1,500 ft²**

There needs to be adequate facilities to provide maintenance and repair service for all bicycles that pass through the center on a daily basis, as well as the bicycles of local residents, and any rental bicycles the center may own. This space should be subdivided as needed. A portion of this area needs to be available as workspace for repair classes and workshops which will be held at the center.

- **Sporting Goods Shop: 1,200 ft²**

This shop will sell sports gear associated directly with bicycling, rollerblading, running and walking (i.e., the modes of transportation most often used on site). There needs to be an outdoor display area associated with the store used to display bicycles that are being sold.

- **Facilities for staff: 1,800 ft²**

The building will provide a comfortable working environment, with adequate opportunities for spending time outside during the work shift. For a valet parking system there would need to be approximately 1 staff member per 50 bicycles at non-rush hour times. At rush hour, there would be twice the staff.

- **Office Facilities: 900 ft²**

These facilities will house the organization that runs the Transportation Center and all community outreach and volunteering programs that may go along with it.

- **Staff Lounge: 600 ft²**

There must be space both indoors and outdoors which serves this function.

- **Staff Storage Area: 300 ft²**

• **Community components :**

• **Restaurant/Café: 1,800 ft²**

- This will be a 24 hour café to be located on site with easy access from both the park and the city. This facility will serve meals at all hours and should serve a diversity of healthy food to accommodate all preferences.
- This must have indoor and outdoor seating, with some outdoor seating that can be well shaded during the summer and some indoor seating that will receive a lot of sun during the winter.
- The siting of the café should take advantage of obtaining the best views possible from the site: unobstructed views of the mountains or the river.

• **Possible Additional Retail Space: up to 3,000 ft²**

This space would provides the possibility to lease space to several small boutiques, or to several different vendors, possibly in the form of a Market Hall, providing the community with access to freshly grown produce.

• **Additional Office Area: 1,500 ft²**

for small non-profit type groups who would be associated with specific program – environmentally friendly groups

- **Classrooms: 1,800 ft²**

This will serve as an area used for workshops, classes, meetings, lectures, and presentations.

- **Public Restrooms: 500 ft²**

- **Service Components:**

- **Loading Dock: 100 ft²**

- **Receiving and Storage Room: 300 ft²**

- Must be capable of receiving deliveries from large trucks, and being able to store and process large packages.

- **Possible Outdoor Components:**

- **Outdoor Gathering Area:**

- **Additional Paths:** There must be complete connectivity over the entire site to the surrounding context. These paths may or may not be paved. There should be a total amount of impervious surface area on the site which should not be exceeded, therefore, these paths might take the form of gravel or stone paths.

- **Garden:** The outdoor space of the site must be fully designed, from the edge of the city all the way to the river. Various different types of gardens may be included as seems needed. The garden area designed must be regionally appropriate, so the use of xeriscape methods is recommended. Specifically, there should also be a garden which attempts to express the sacredness of water in such an arid climate.

• **Bridge:** A new bridge crossing the Cherry Creek is necessary as well as the possibility of a new or enhanced bridge along 15th Street crossing the South Platte River. The bridges should be tied into the construction of the proposed building and arrangement of the site, wither through its character, tectonic expression, or its actual structure.

Total Square Footage: 23,700 ft²

PRECEDENT

Design for Bicycles:

“More than just a public transit facility...a community hub for bicycle advocacy, transit information and community events.”

--The Federal Highway Administration on
The Long Beach Bike Station³⁰

The Bike Station Coalition is a national non-profit organization which has already been instrumental in the creation of Bike Stations in Berkley, Palo Alto and Long Beach, California.³¹ These three facilities vary, but they all have a direct connection to a form of public mass transit as well as to local bicycle paths. For example, the Bike Station in Palo Alto offers free valet parking for up to 150 bicycles, high quality bicycle rentals, a bicycle accessory shop, a changing area, a coffee bar with patio seating and educational and advocacy programs.³² The Long Beach Bike Station was the first to be opened in the United States in March of 1996. This station is located at the southern end of a light rail line which runs 25 miles directly north to downtown Los Angeles. The building was designed by the architect Fernando Vasquez. It is constructed of lightweight steel components inspired by bicycles and the folded metal shipping containers used in Long Beach Port. Because of its location in such a mild climate, the shelter for the bikes is merely a translucent fiberglass canopy over open bike racks.³³ The interlocking structure

³⁰ Jager, Rick and Marc Littman. Press Release from MTA Media Relations.
April 21, 1999. <http://tdc-www.harvard.edu/massbike>

³¹ <http://www.bikestation.org>

³² <http://paloaltobicycles.com/bikestation.html>

³³ Webb, Michael. “Building for Bikes.” Metropolis, July/August 1997, vol. 17, n. 1, p. 42.

is bolted to concrete pads and can easily disassembled if a more ideal location seems to present itself. The station also is home to a program called City-Wheels, an all-electric vehicle sharing program which rents electric bicycles, scooters and cars. Since its opening in 1996, the Long Beach Bike Station has been awarded the Environmental Excellence Award in Community Livability by the US Department of Transportation's Federal Highway Administration, as well as numerous awards from organizations such as the US EPA, AIA, and Californian planning and environmental commissions.³⁴

There is currently a proposal for a Bike Station to be constructed in the parking lot of Union Station, Denver's historic train station. This will be the first Bike Station in the United States apart from the above mentioned stations in California. The proposal is for a relatively inexpensive, mobile structure constructed of glass and steel, which could be moved after a while if a different location is deemed more suitable. The proposed plans for the bike station have been developed by a collaborative effort between the national non-profit group, the Bike Station Coalition, as well as Denver RTD, the City of Denver, the Downtown Denver Partnership, and local neighborhood groups and bike advocates. Siting the Bike Station in the parking lot of Union Station will allow for direct connections to a variety of different transportation options as the Bike Station is merely one aspect of a larger plan to redevelop the historic train station into a full blown intermodal terminal linking regional bus service, light rail, commuter rail, the free downtown shuttle service, Amtrak, the SkiTrain, Greyhound buses, bicycles and electric vehicles. The following is a list of the attributes of this proposed building, this will be helpful in determining programmatic requirements:

³⁴ <http://tdc-www.harvard.edu/massbike>

- 1,800 square foot single story building
- Bike parking for 150 bikes, valet parking service
- 450 square foot shower & locker room facility
- Bicycle repair and accessory shop (Approx. 500 – 750 square feet of retail space)
- Bikes available for renting
- RTD transit information kiosk
- Patio seating area adjacent to 16th St. Mall
- 500 square feet of additional storage space inside Union Station.



Figure 41: As an important community gathering place, public art is an important aspect of Bike Station Long Beach.



Figures 42 & 43: The Bike Station in Long Beach is comprised of separate pavilion structures which are tied together by a steel exo-skeleton framework.

Figures 47- 49: Bike Station in Long Beach



Figure 44: The design of the Long Beach Bike Station was inspired by the tectonics of bicycles and by the aesthetic of the shipping crates of the nearby docks. The entire structure is modular, designed with the intention that it can be adapted to other sites.



Figure 45: Section of the Long Beach Bike Station, constructed by architect Fernando Vasquez of Los Angeles.

Figures 50- 51: Bike Station in Long Beach

Possible Bicycle Storage Options:



Figure 46 The Long Beach Bike Station storage is all open to the air, covered with translucent fiberglass which allows the space to remain well lit while still protected from the elements.



Figure 48 Indoor Bicycle Storage in the Palo Alto Bike Station.



Figure 47A bike locker at an Adelaide Metro Station, South Australia.
www.bisa.asn.au/pics/bikelockeropen.JPG

Figure 49 Outdoor covered Bicycle Storage at a primary school in England
www.spinney.cambs.sch.uk/event/tour/



Figures 52– 56: Bicycle Storage types

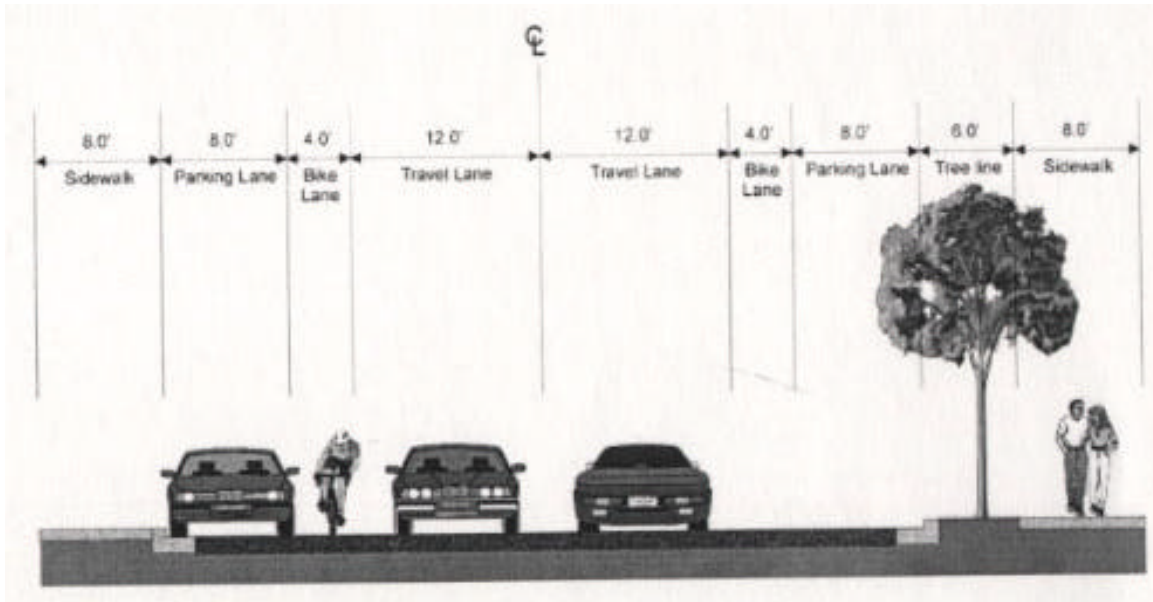


Figure 57: Typical street section for a street which contains 2 lanes of traffic, parking on both sides and 2 bike lanes.

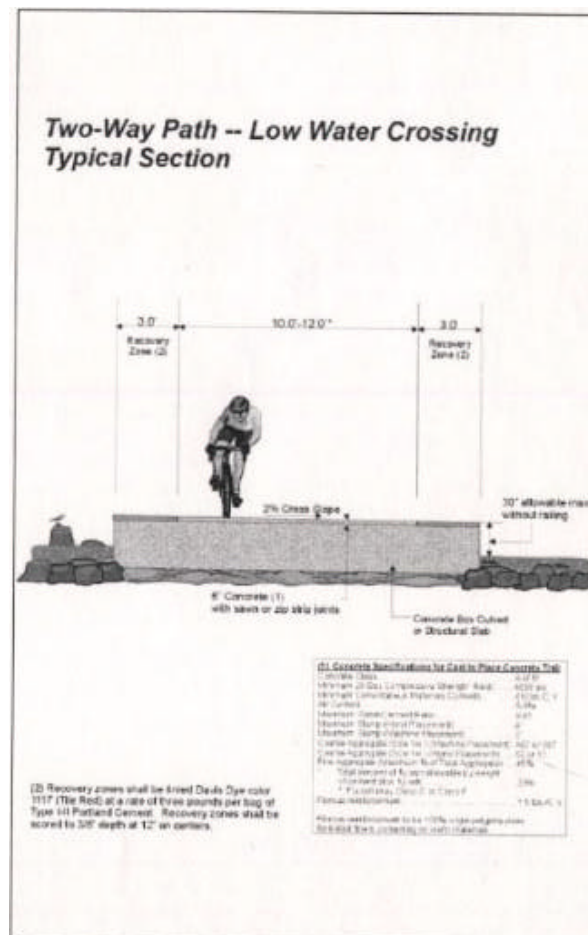


Figure 58: Typical section of a two way bicycle path adjacent to a river or creek, from the Colorado Bicycle Master Plan.

Train Stations:

Looking at transit centers of all types from around the world is helpful in understanding how the proposed center might function. As an Alternative Transportation Center, the only difference between the proposed building and any other transit station is the mode of transportation used. Therefore, the scale will be slightly smaller and fit to human proportions (like the proportions of the design of a bicycle), but the overall arrangement of circulation, procession and ceremony will be similar to any of the great train stations of Europe. The following are two of Otto Wagner's stations, built along the Stadtbahn in Vienna in the 1890's.³⁵

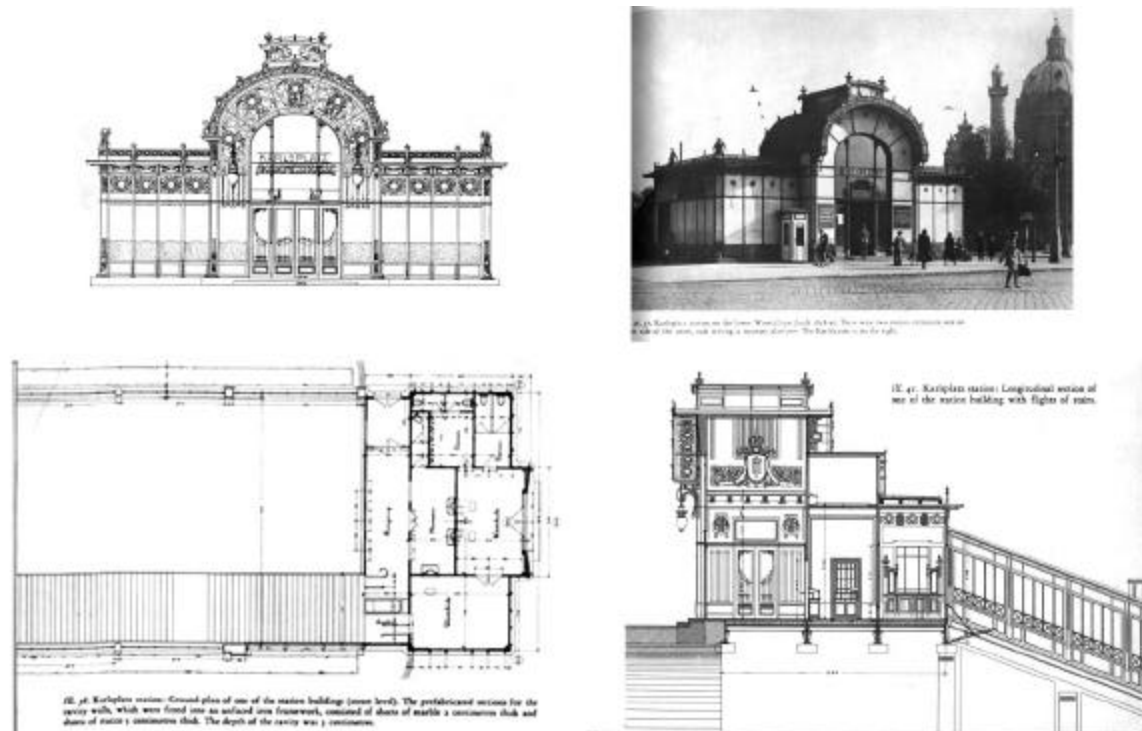


Figure 59: Otto Wagner's Karlsplatz Station.

³⁵ Geretsegger, Heinz and Max Peintner. Otto Wagner: 1841-1918. New York: Praeger Publishers, 1964.

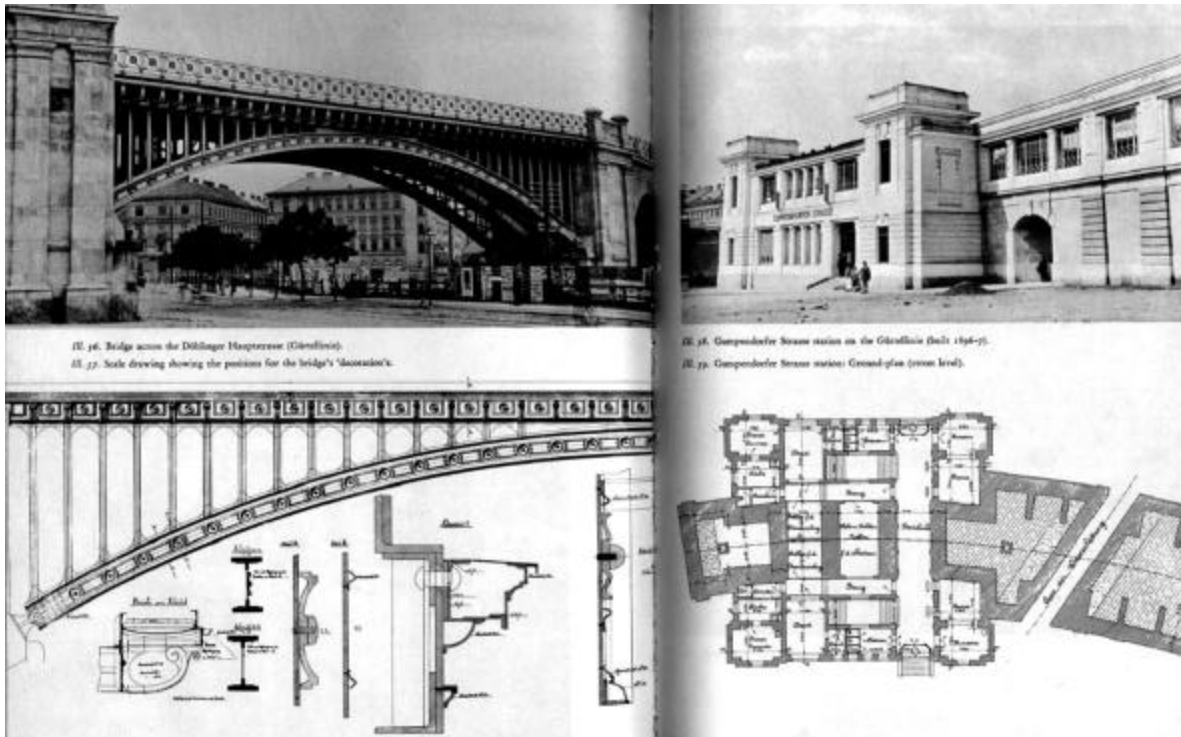


Figure 60: Otto Wagner's Gumpendorfer Strasse Station.

The highway service station at La Baie de Somme in France was analyzed for programmatic reasons as well as for its environmental responses. Like the transit center proposed by this thesis, this station includes the basic transportation services as well as housing a gallery, a restaurant, and an outdoor nature area. It is located adjacent to a canal and uses a turbine to generate electricity which it then stores and sells to EDF. There is a water filtration system on site that filters runoff water. The building is very sustainable, it is easily cooled because of its deep projecting eaves and double glazed curtain wall with two-way ventilation heat recovery.³⁶

³⁶ Gauzin-Müller, Dominique. Sustainable Architecture and Urbanism: Concepts, Technologies, Examples. Basel, Switzerland: Birkhäuser Publishers for Architecture, 2002.

The proposed Alternative Transportation Center has a similar site situation, located adjacent to water on the plains. The proposed building also has the opportunity to produce wind energy and to filter run-off water so that it does not pollute the ground water or the river.



Figure 61: Motorway Service Area at La Baie de Somme, France, by Bruno Mader.

Fig. P5 Motorway Service Area at La Baie de Somme, France
Diagram showing interior and exterior circulation zones

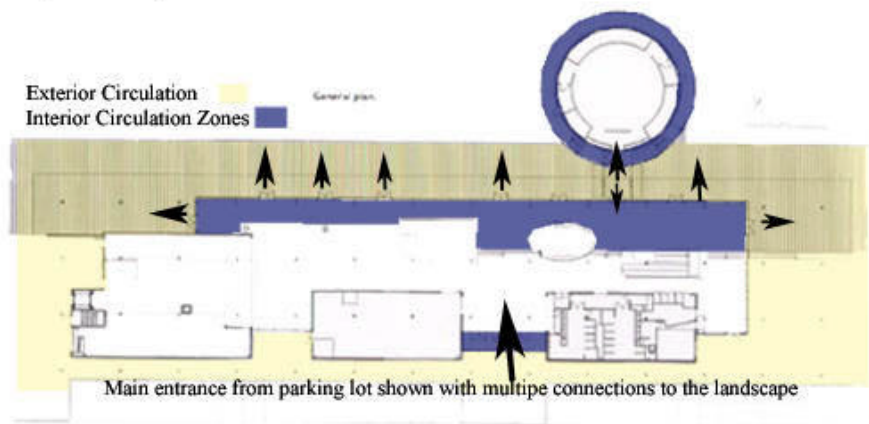


Fig. P6 General view of the building with its large lookout tower

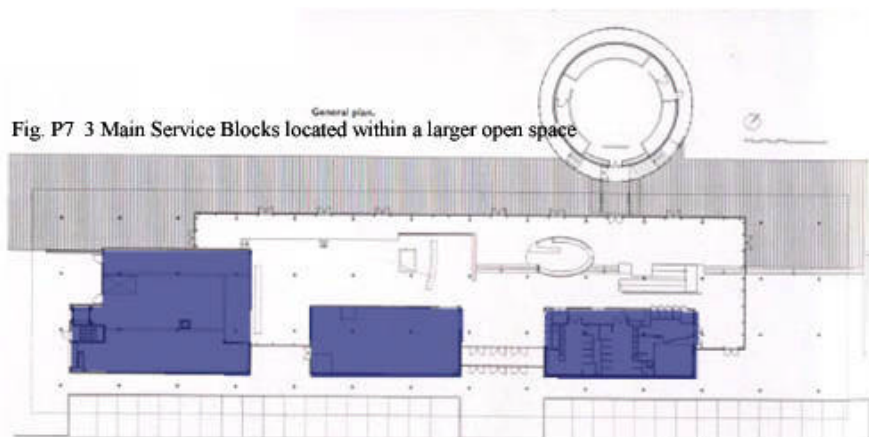


Figure 60: Plan diagrams of La Baie de Somme Service Area showing circulation and main service blocks.³⁷

³⁷ Ibid.

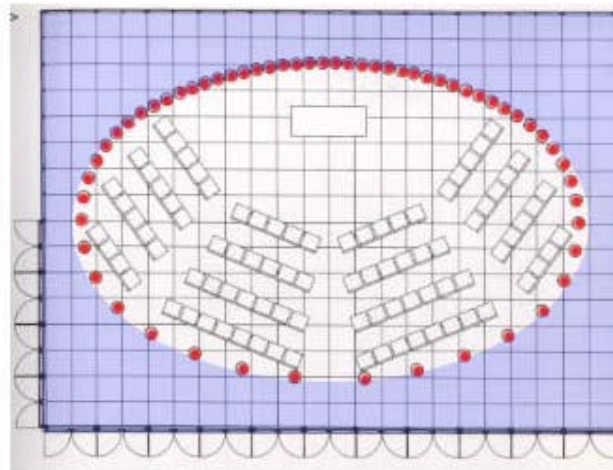
Urban Parks:



Figure 61: Viaduct des Arts, Paris. Essentially a former brownfield, like the site along the Platte River, this was the redevelopment of a transit corridor into a greenway. The linear park is also similar to the linear parkway along the river in Denver.

Alternative Materials:

Paper Church in Kobe, Japan by Shigeru Ban, 1995



An earthquake in 1995 spurred the development of this temporary community hall, constructed of recycled materials.

The columns are all paper tubes, remnants of large scale rolls of paper. These paper tubes serve as the primary structural system, shown in red.

The columns create the main space of the church, the protection from the elements is provided by the glass block enclosure. The interstitial area becomes a zone where the light filtered in from the glass enclosure illuminates the paper columns very beautifully.

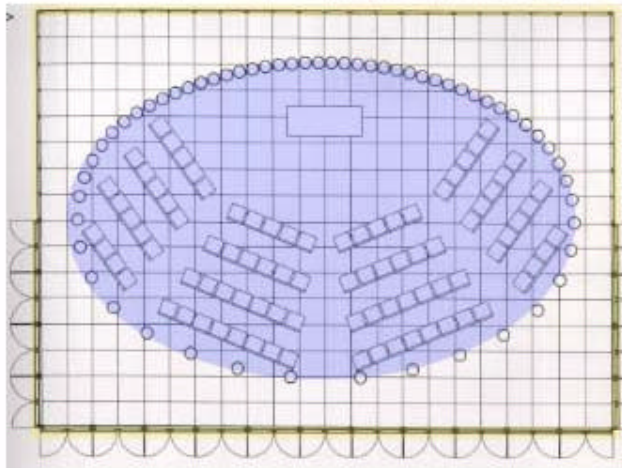


Figure 62: Paper Church in Kobe, Japan by Shigeru Ban, 1995. This is an example of the possibility of re-using materials in an unconventional way. The room is also structured by a web, emanating from the center of the ellipse, much like the structural system of a bicycle wheel with its spokes.

LANDSCAPE DESIGN



Figure 63: Japanese Garden, Masuno. This Garden integrates water with land and with the Building in an elegant and beautiful way. The building's outdoor functions become natural elements in the garden, whereas the interior spaces remain regular and rectilinear.



Figure 64: View from above of the Same garden. All of the natural elements have been carefully composed yet are not synthetic.

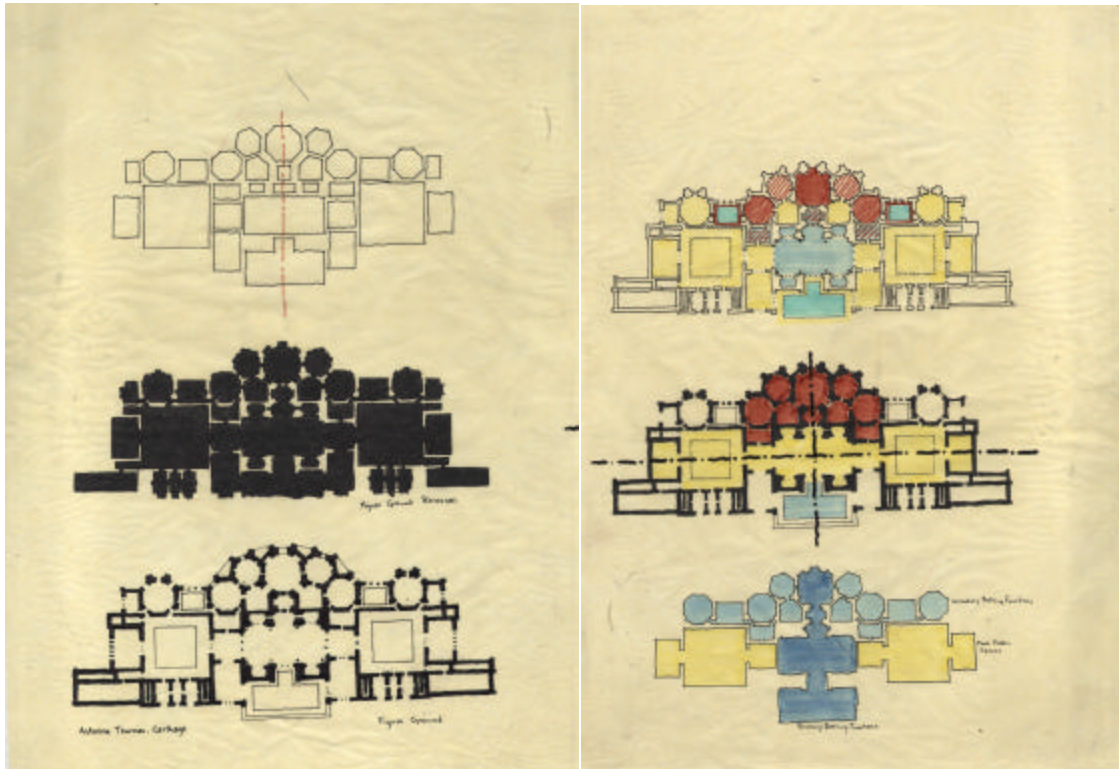


Figure 65: Analysis of the imperial roman bath at Carthage.

DESIGN APPROACH

This project will attempt to create an appropriate regionalist response to the context in which the proposed building(s) will reside. Possible regionally appropriate design strategies can be developed by taking clues from the surrounding context; the built environment, the natural environment and the cultural context.

The proposed building will espouse certain environmentally friendly principles in order to serve as a model to educate the public about alternative construction methods, alternative materials and sustainability. The focus will be on using the appropriate technology to solve each problem. Technology is the application of ideas, energy and resources to solve problems and create change. Appropriate technology is that which strives to minimize negative consequences to all life, and connects people with each other and the Earth.³⁸ Because of the nature of the building proposed, it must take on a form which is not only connected to the spirit of its place in poetic terms, but also celebrate its location and its purpose through the use of appropriate tectonics. In addition all of the buildings systems will be carefully considered and made as 'green' as possible whenever appropriate.

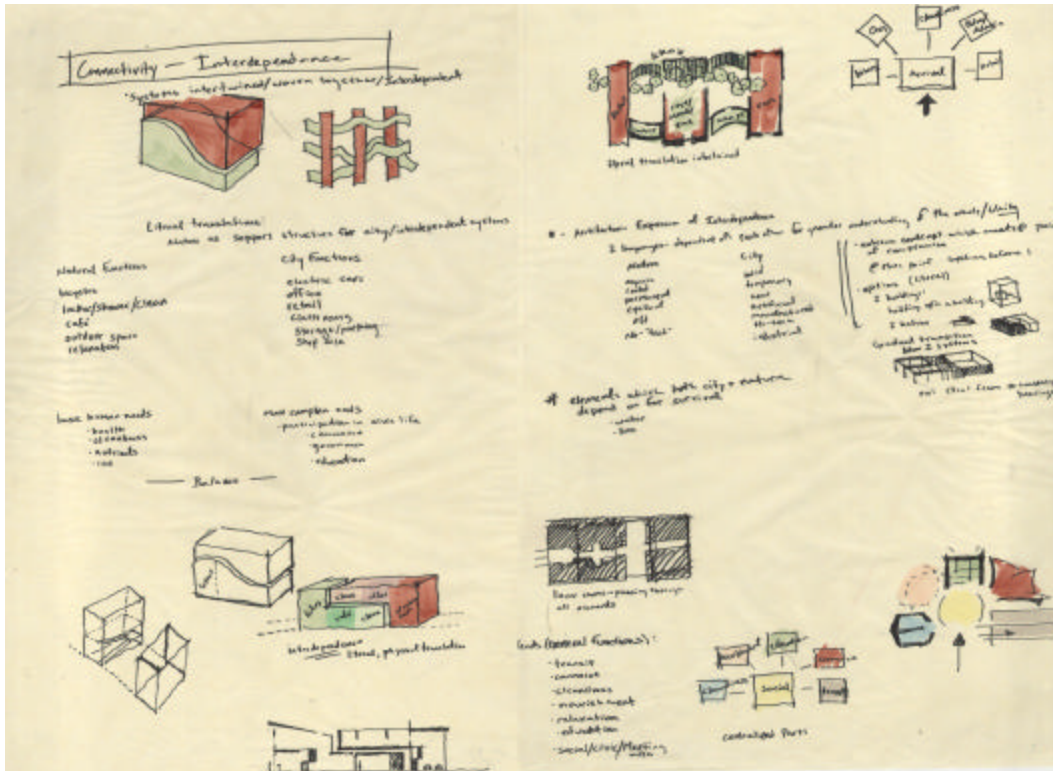
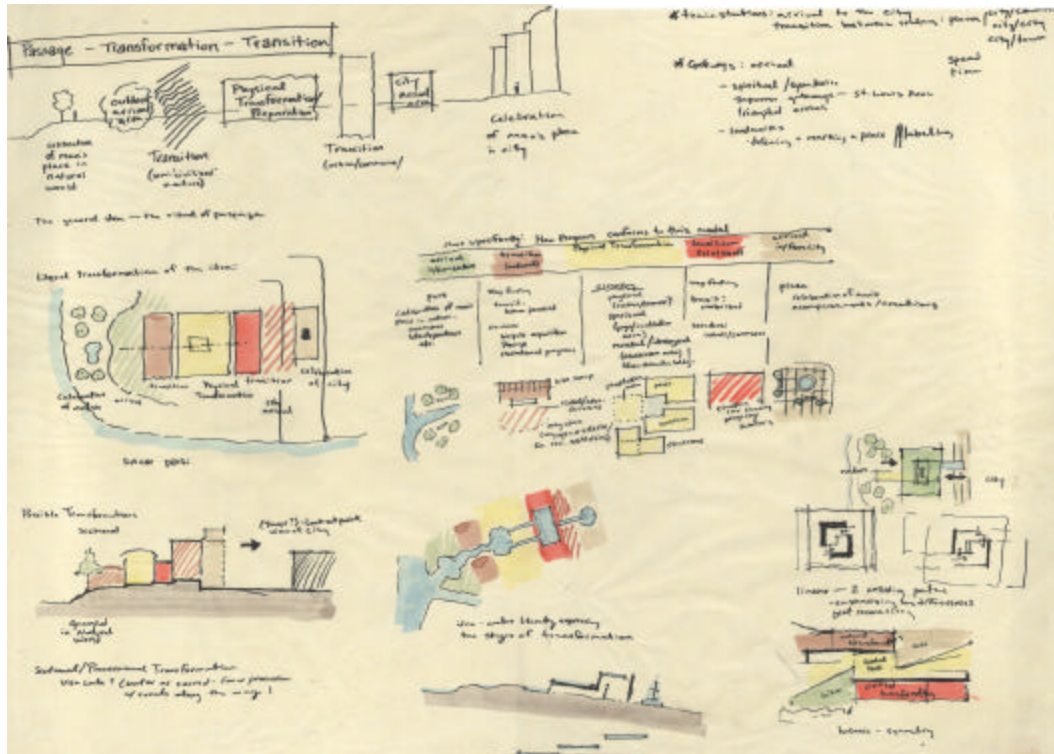


Figure 67: Diagrams which speak to the idea of connectivity and interdependence. In attempting to create a connection between the urban realm and the natural realm, the idea of the two systems which are inherently interconnected and interdependent could translate into a spatial or architectonic idea.



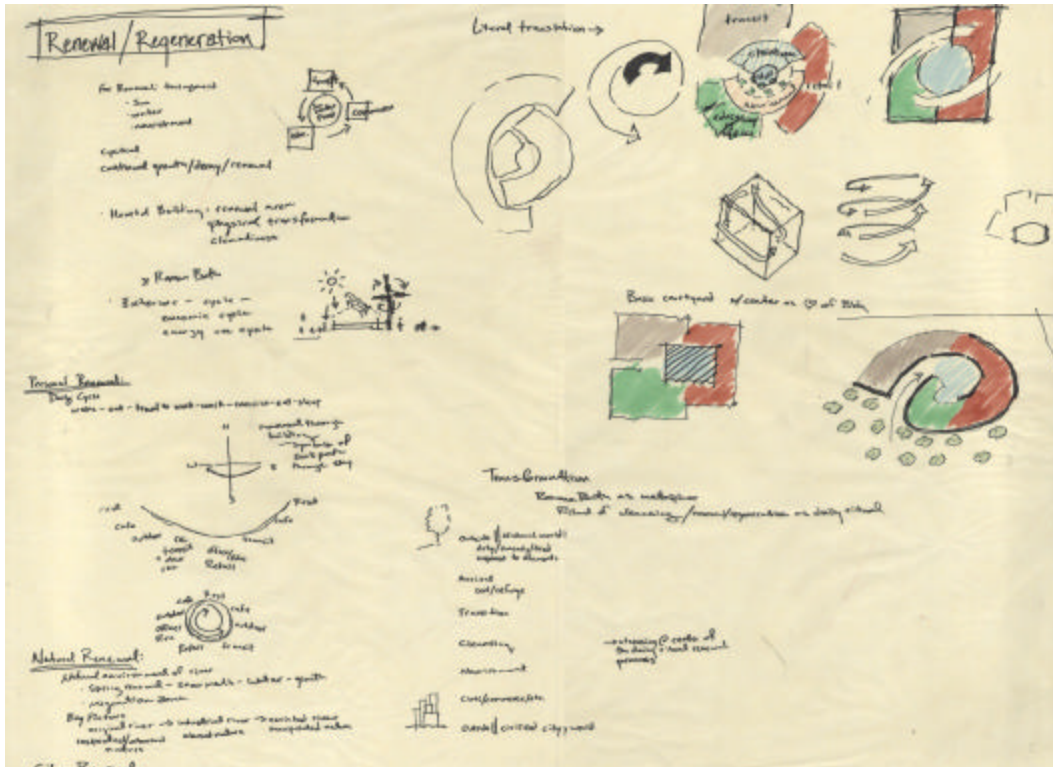


Figure 69: The ritual of communing with nature on a daily basis and passing through the proposed site on a daily basis leads directly to the idea that this ritual can be seen as a daily process of renewal or regeneration. In the same way that any natural system is in a constant state of renewal, so are our daily lives.

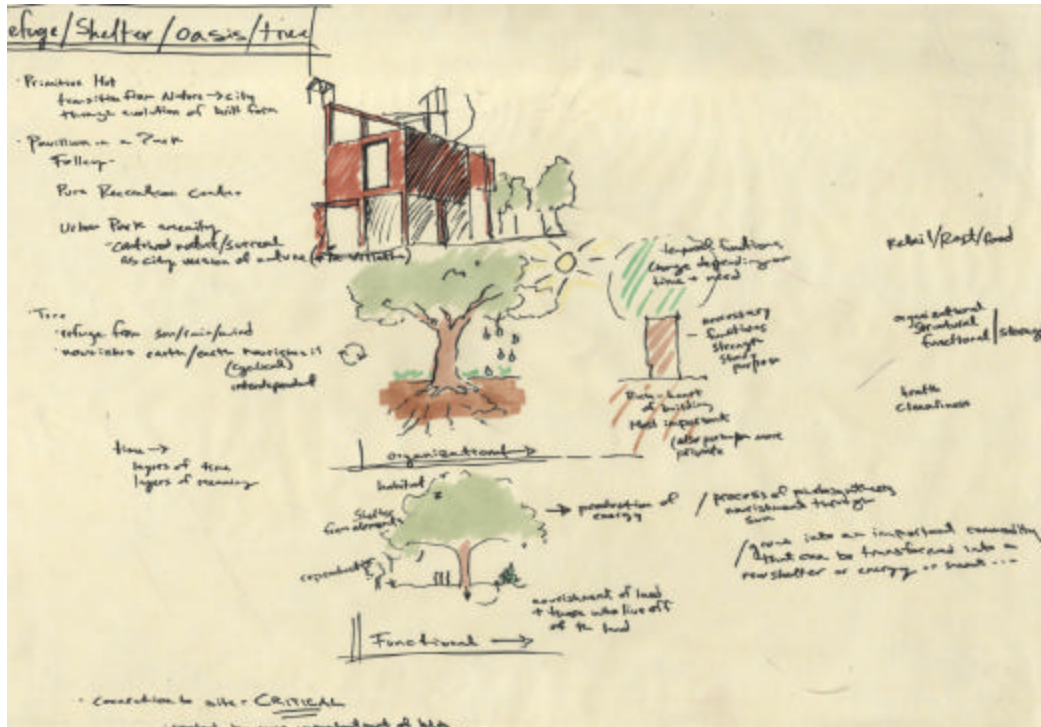


Figure 70: The proposed bike station could be thought of as a shelter and a refuge from the elements. This diagram explores the idea of shelter and refuge, which is directly connected to the idea of a tree located on the prairie. A tree could be a strong metaphor for the sustainable aspirations of this project, providing for the development of a continual system of renewal.

Landscape Design:

The design of the surrounding landscape will also be an important portion of the project. The surrounding landscape was recently developed as Commons Park which will be redeveloped with this proposal. The design intentions of Commons Park will be taken into consideration, but the actual materials that make up the landscape will definitely be altered. The current park has been planted with wide expanses of very green grass which most likely requires more maintenance and watering than is necessary. The more regionally appropriate approach to landscape design would be to use xeriscaping. Xeriscape is a method of landscaping that promotes water conservation. The word “Xeriscape,” was coined by the Denver Water Department in 1981 to help make water conserving landscaping an easily recognized concept. The word is a combination of “landscape” and the Greek word “xeros,” which means “dry.”³⁹ Rather than a specific “look” or a limited group of plants, Xeriscape is a combination of seven basic landscaping principles: planning & design, limiting turf areas, selecting and zoning plants appropriately, improving the soil, using mulches, irrigating efficiently, and doing appropriate maintenance.

³⁹ <http://www.coloradotrees.org>



Figure 71: An aspen tree and native grasses and brush located in the Groves area of Commons Park, adjacent to the proposed site.

POSSIBLE SCHEMES

Scheme 1: 3 Pavilion Scheme

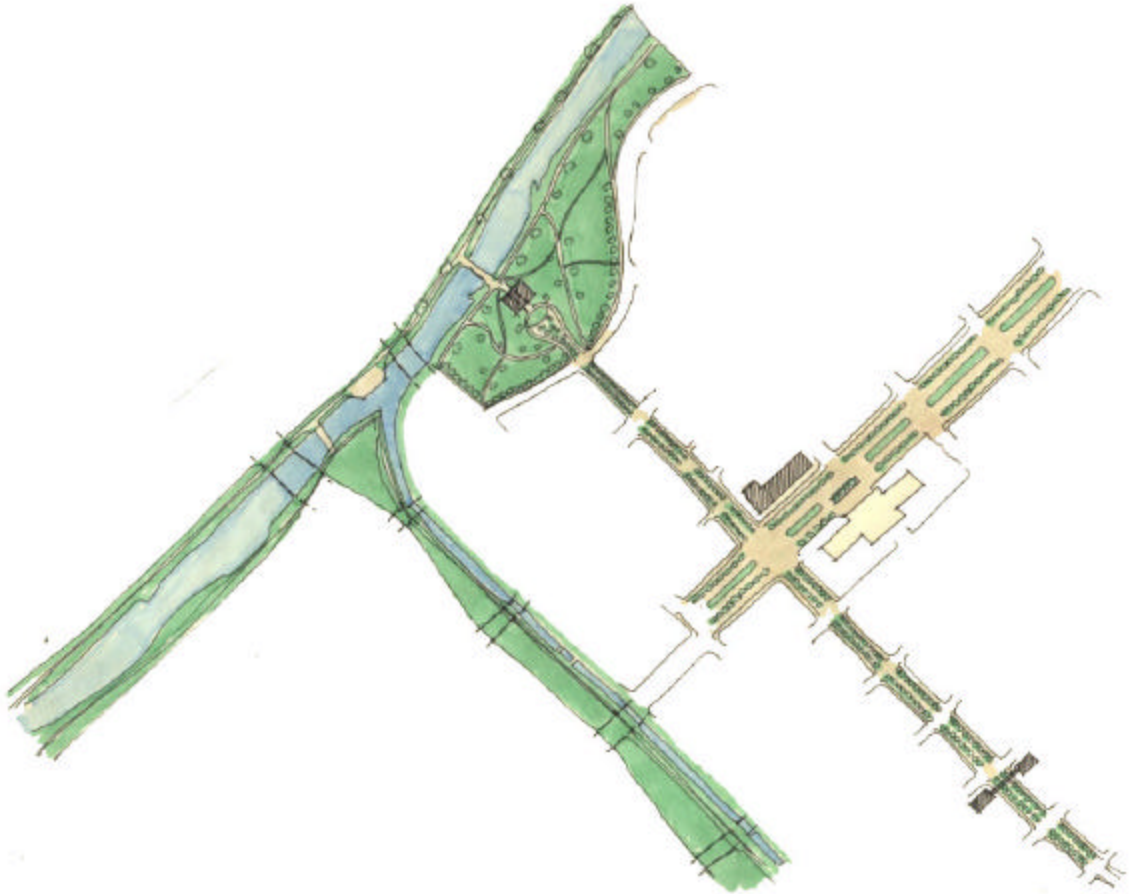


Figure 72: Scheme 1: 3 Pavilion Scheme:

This Scheme completely separates all of the disparate functions which could possibly be combined in the Alternative Transportation Center and allows them to remain as separate buildings connected to each other through their location along a Bikeway/Pedestrian street through the city. In this scheme, the pavilion in the park remains as a building in the landscape, its role is to begin the transition from the natural world of the greenway along the river to the concrete city life. This pavilion would contain a café and restrooms and would be primarily focused on serving the recreational

path user. The second building is a large community/market hall located across from Union station. This might also house some of the strictly transit oriented functions of the program, such as an electric car sharing program, storage of rental vehicles and bicycles, and storage for local pedal-cab operators. The final building, which is located further into the heart of downtown, would be the Bike Station component of the program. This would house daily bicycle storage and maintenance facilities as well as have locker/shower facilities for commuters. Located along 16th Street, a current pedestrian mall, this building would include retail on the ground level, therefore, some of the commuter facilities might be located on the second floor.

Figure 73: 3 Pavilion Scheme Sketches

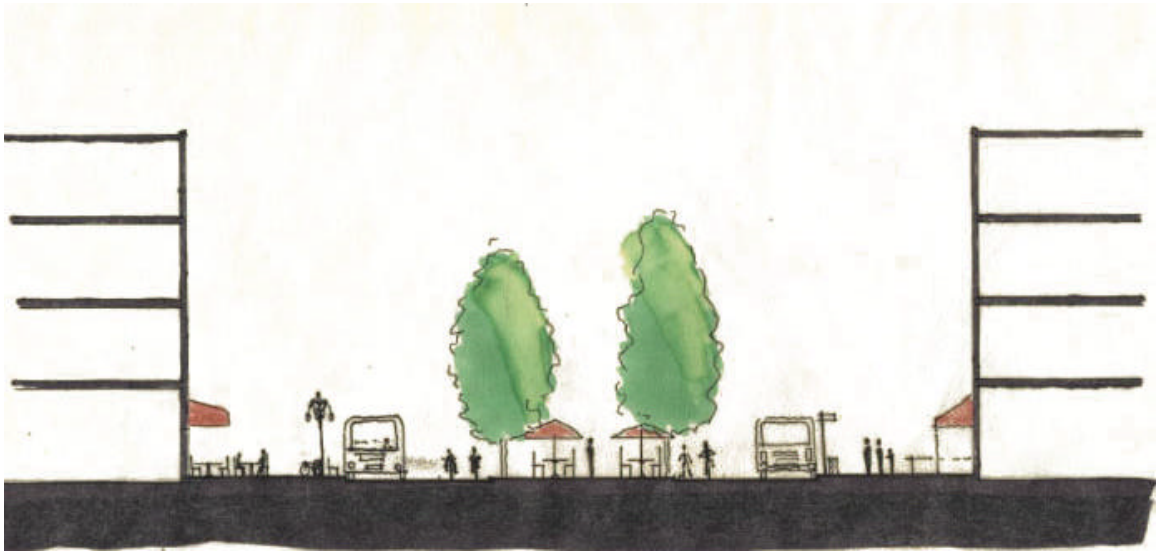


Figure 74: Pedestrian/Bikeway Boulevard: Proposed section for the continuation of the 16th Street Mall in all of the schemes. This proposal adds bicycle lanes adjacent to the electric bus lanes and still allows for plenty of outdoor gathering space for pedestrians.

Scheme 2: The Axis of Transportation

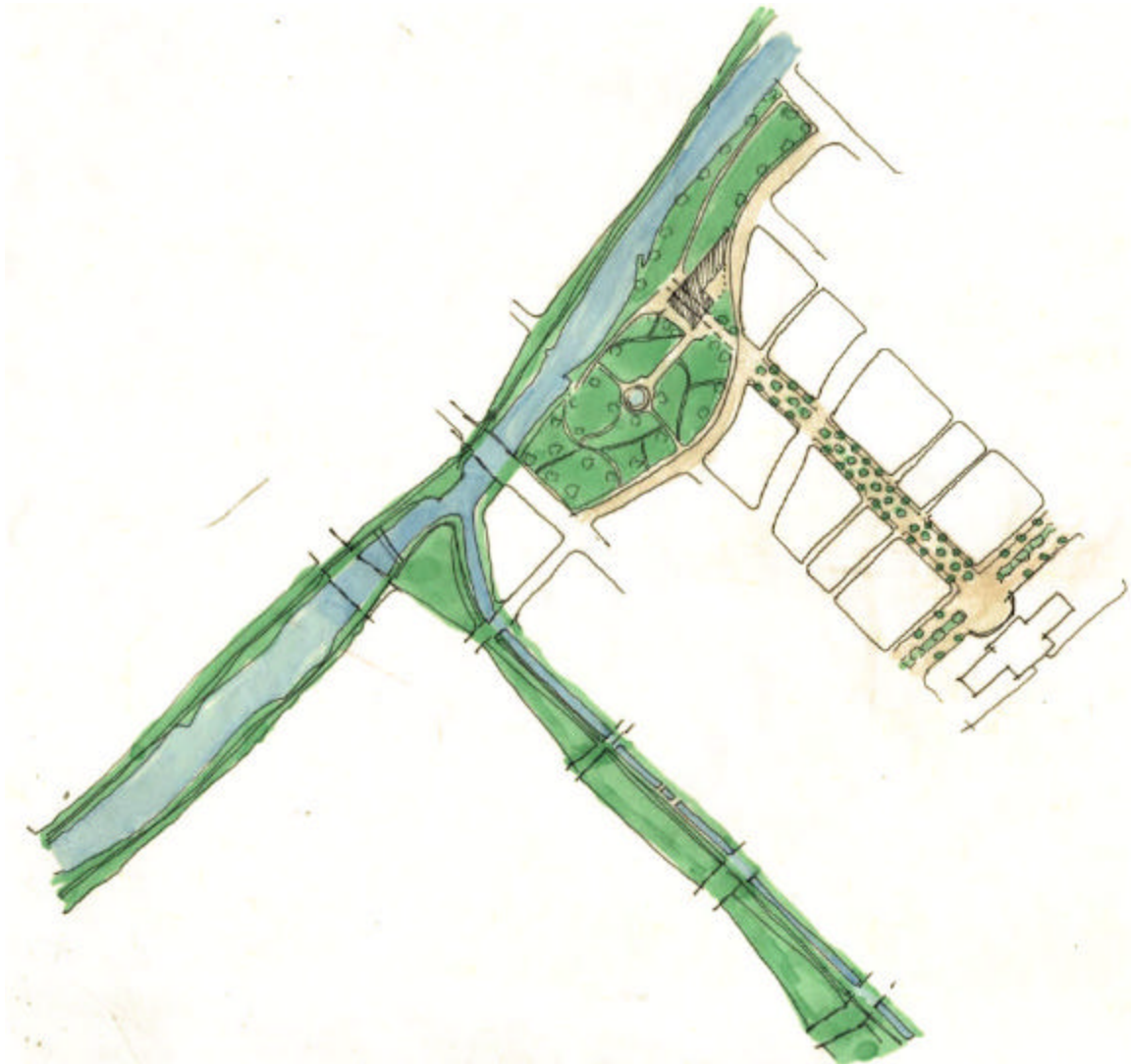


Figure 75: Scheme 2: Emphasizing the Axis of Transportation

Scheme 2 places all of the Transportation Center's functions in one large building located on the end of a direct axis between the park and Union Station. This scheme creates a Pedestrian/Bikeway boulevard along the main axis. The building is organized

around a spacious gallery which would be covered, but open during the day so that bicyclists and pedestrians to emerge from the path and move directly through the building on their way to the city. In this scheme the building can be seen as a gateway between the city and the river, and the transition between the two environments takes place during the passage through the building. This would provide the challenge of determining how one can architecturally express the transition from nature to the city.

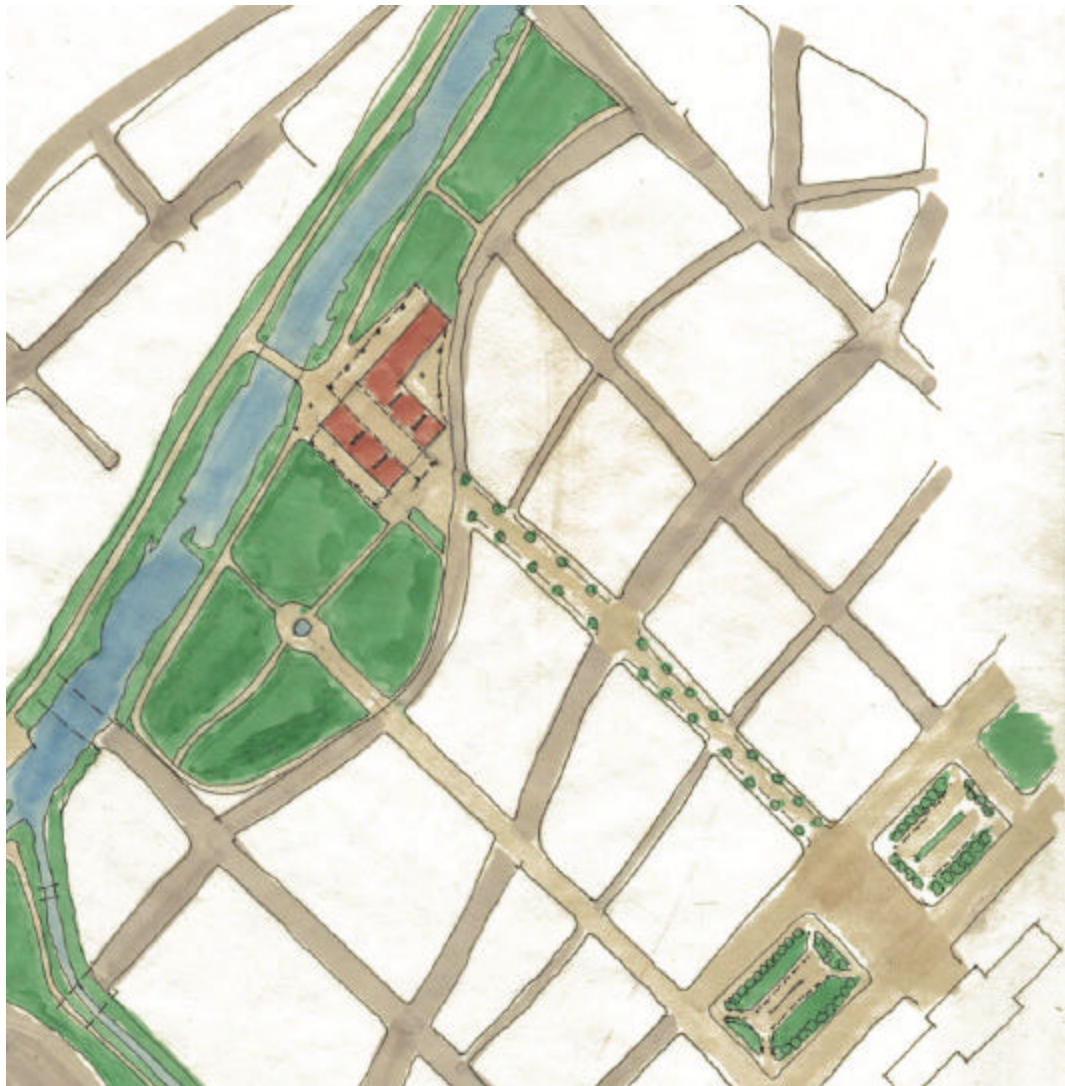


Figure 76: Scheme 2: More detailed sketch of the proposed building. The ground floor would be primarily commercial/retail on the south side, with the transit specific

functions on the north side of the building, and more private functions on the upper levels.

Scheme 3: Transportation Complex

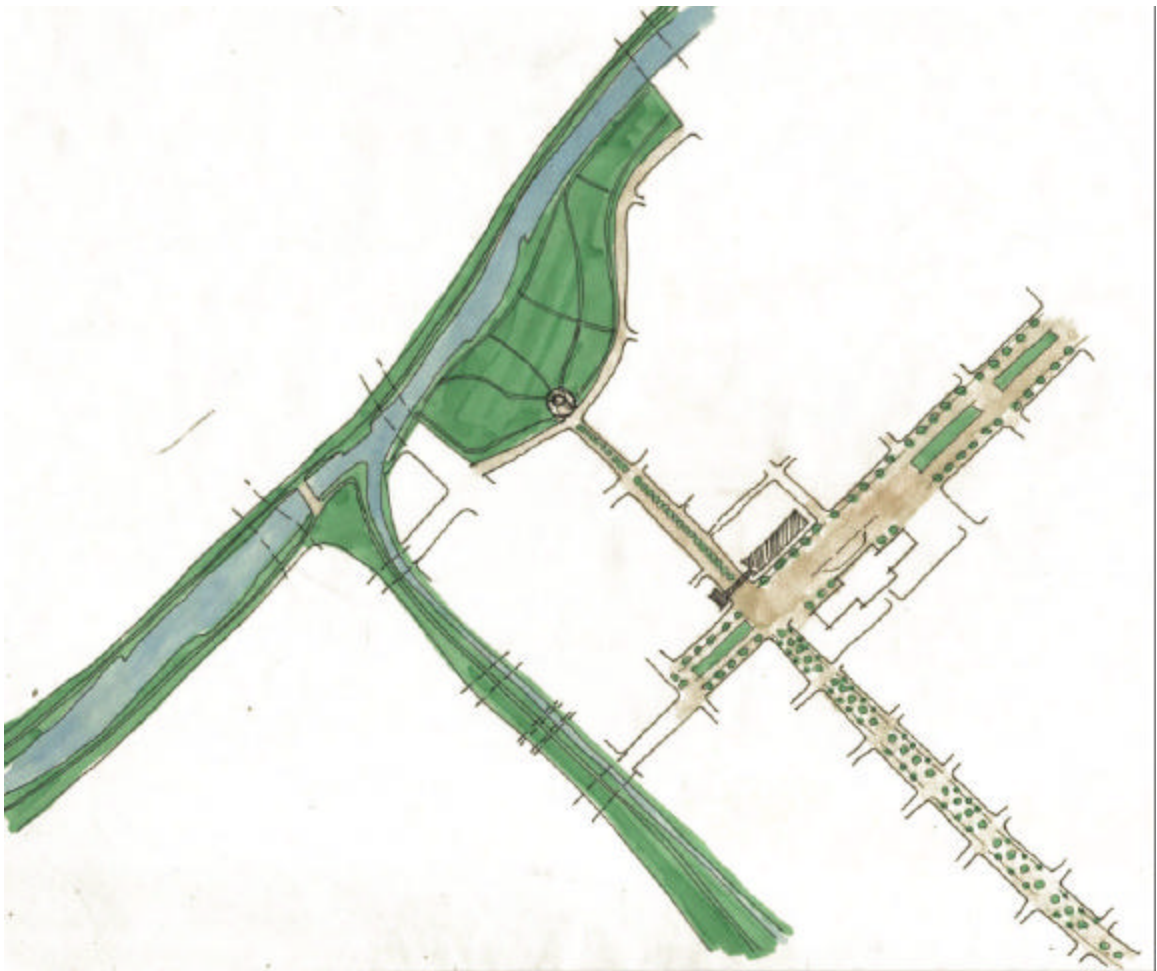


Figure 77: Scheme 3: Transportation Complex Scheme

Scheme 3 leaves the park as man made nature, with no built structures placed within it. The building becomes part of a larger transportation complex, directly associated with Union Station, around a public plaza. In this scheme, as in previous schemes, the 16th Street pedestrian mall is continued all the way to the park.



Figure 78: Scheme 3: A more detailed view of the proposal of scheme 3.

Scheme 4: Pavilion in the Park

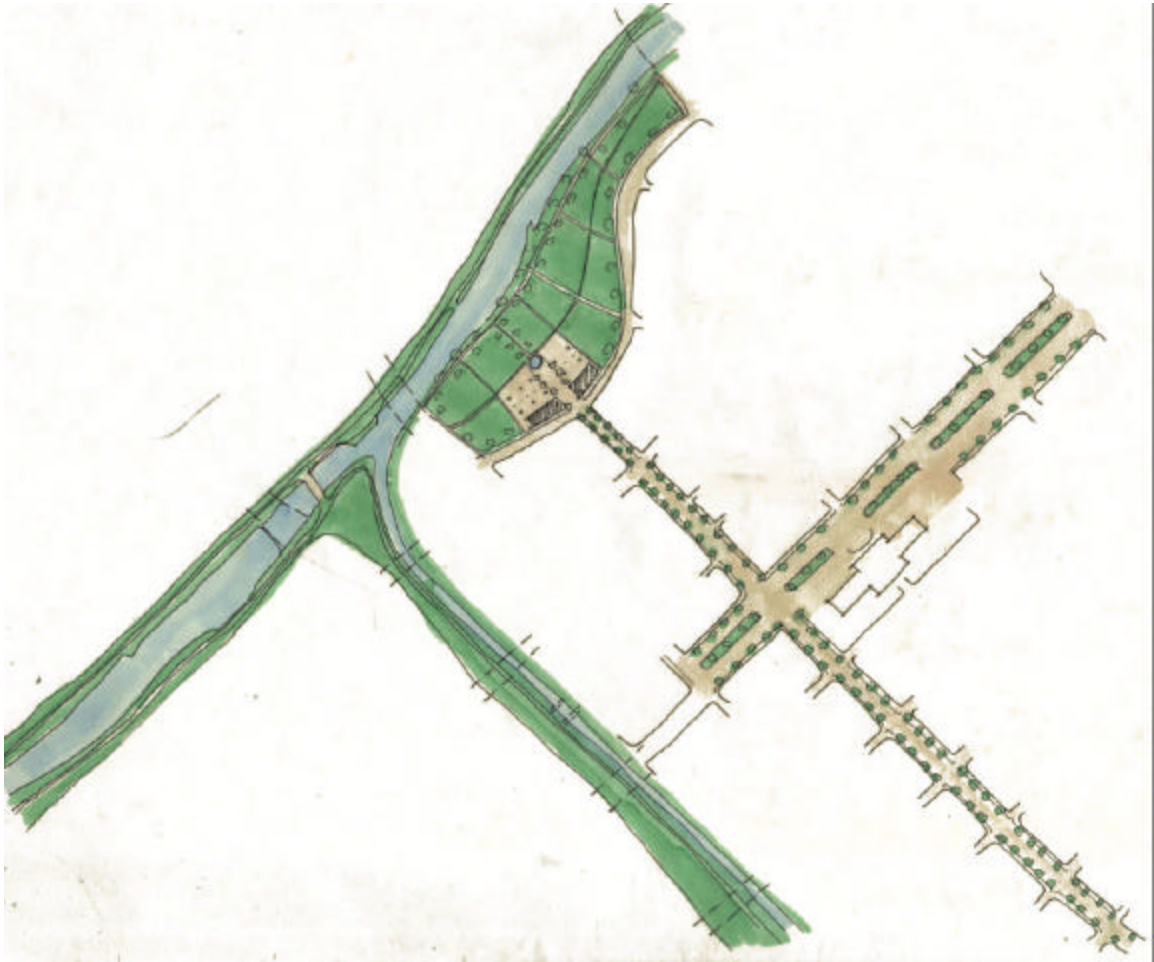


Figure 79: Scheme 4: Pavilion in the Park

Scheme 4 proposes a pavilion in the park, located on the end of the existing 16th Street pedestrian mall axis. The pavilion, or pavilions, would be located on the edge of the park. The commercial/retail functions are located on the southeast side of the buildings on the ground floor. The bicycle specific functions would primarily be located on the park side of the buildings, with any motorized transit functions located on the street side. The upper floors would house more private functions, such as locker rooms, community rooms, classrooms and offices.



Figure 80: Gradual transition between nature and the city.



Figure 81: Courtyard scheme:

DESIGN CONCLUSIONS



Figure 82: Confluence Station

This extensive exploration resulted in the design of Confluence Station, a collection of six pavilions, arranged along an upper terrace which embraces a lowered courtyard leading to the water's edge. At first glance, the pavilions seem to be organized almost randomly, but upon closer inspection, one can see that they are arranged in a way to create a series on dynamic spaces and dynamic views of the site, the natural context and the urban context.

The organization of the pavilions is partially based on a theory of Doxiades'⁴⁰ on the organization of Greek temple sites. His theory states that from one significant point,

⁴⁰ Doxiadis, Kōnstantinos Apostolou. Architectural Space in Ancient Greece. Berlin Charlottenburg Technische Hochschule, 1937.

one is able to see each important object in the landscape on the oblique. Each of these objects can be seen within thirty degree view angle corridors from one specific point upon entering the sacred grounds. In the design for Confluence Station, one comes across this optimal view at the point where the bridge from Confluence Park lands on the site. From that point, one has a view of the entire site and sees each pavilion on the oblique. This gives an immediate understanding of the relationship between buildings and open space on the site as well as an understanding of the tectonic nature of the buildings.



Figure 83: Confluence Station in the context of the surrounding neighborhood. Confluence Station reads as part of the continuous parkland which lines the South Platte River. It is neighbored to the south by Confluence Park and to the north by Commons Park.



Figure 84: The site plan of the proposed design of Confluence Station. In this scheme, significant public gathering spaces are created at the water's edge at the confluence of the two waterways and at the urban street intersection of 15th Street and Little Raven Street.

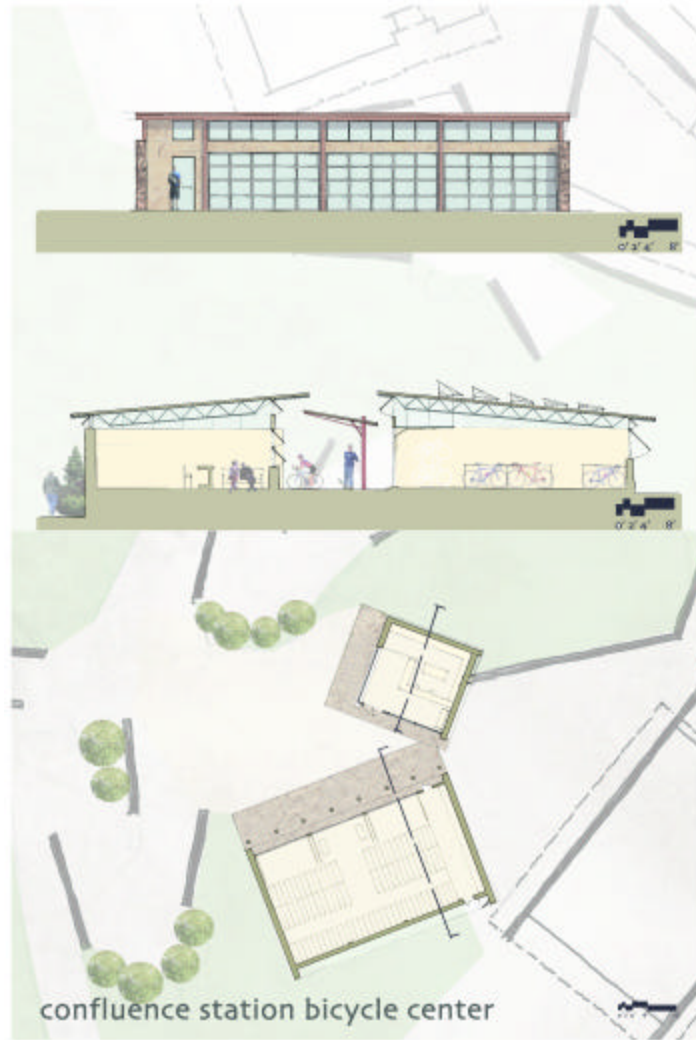


Figure 85: The Confluence Station Bicycle Center is composed of two pavilions which house the program which deals directly with the storage, maintenance, rental and care of bicycles. The smaller pavilion to the north houses facilities for the staff that would maintain the bicycle garage. The garage, the larger pavilion to the south, would house commuters' bicycles as well as bicycles and rollerblades available for recreational rental use.

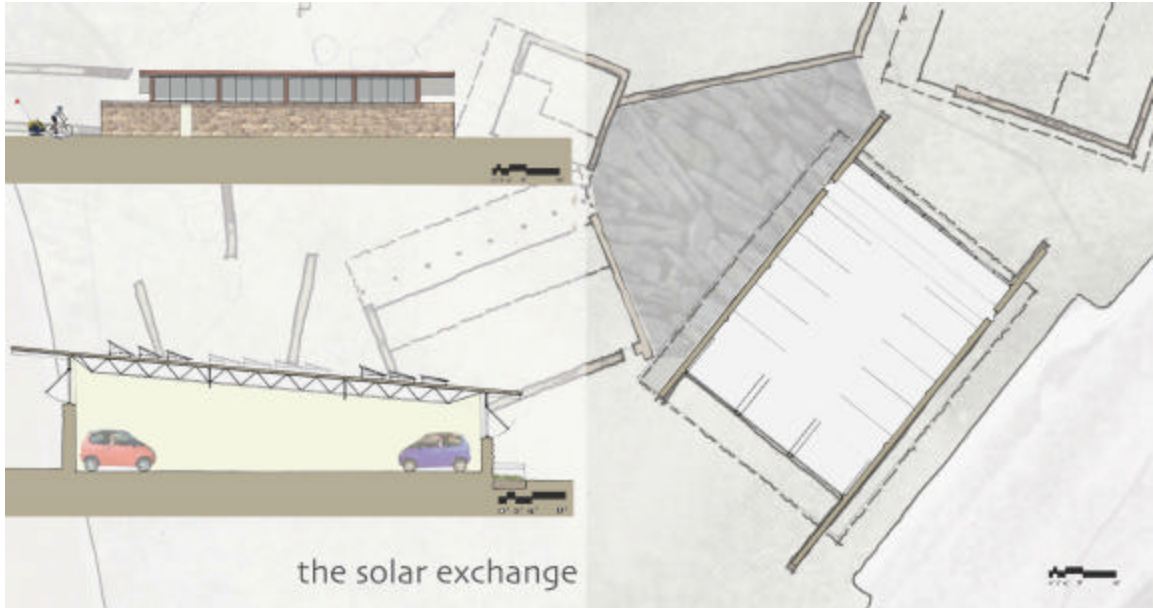


Figure 86: The Solar Exchange is a garage which houses the facilities for an electric car sharing program. This would provide a hub for an electric car sharing program such as ZipCar or FlexCar in which the cars themselves would be stationed around town as needed and only come to the Solar Exchange for maintenance or re-charging.



Figure 87: The Hub is the central building in the scheme from which all of the other buildings are organized. The Hub contains locker rooms on the ground level, accessible from the lower courtyard or interior stairs, a general community area on the first floor, accessible at street level, and office space for small non-profit organizations on the second floor.



Figure 88: The Bike Peddler is a specialty boutique, accessible both from 15th Street and the terrace. This would provide a rather flexible space for a retail establishment which would sell specialty items which celebrate the use of alternative and sustainable energy and material sources. Such an establishment would cater to commuters and recreational riders passing through the site as well as to other customers who would be attracted to the ideals and spirit of the site yet who may not be traveling through the site on a regular basis.



Figure 89: Sprocket's Café is the final pavilion on the north side of the site, closest in proximity to the shore of the South Platte River. This pavilion provides terraces on both the eastern and the western sides to best observe the sunrise and sunset from the café. The upper terrace ends in front on the café and transitions into a ramp which leads down to the lower courtyard. The ramp is defined by rough site walls which seem to be emerging naturally from the earth. The ramp descends in a series of switchbacks, reminiscent of switchbacks on mountain trails.



Figure 90: Site section through the bicycle pavilions, the courtyard of the site, and the peddler's boutique, looking at the parkside façade of The Hub.



Figure 91: Site Section through main building extending from Little Raven Street, through The Hub, through the courtyard, across the South Platte River, looking towards Sprocket's Café and the Peddler's Boutique.

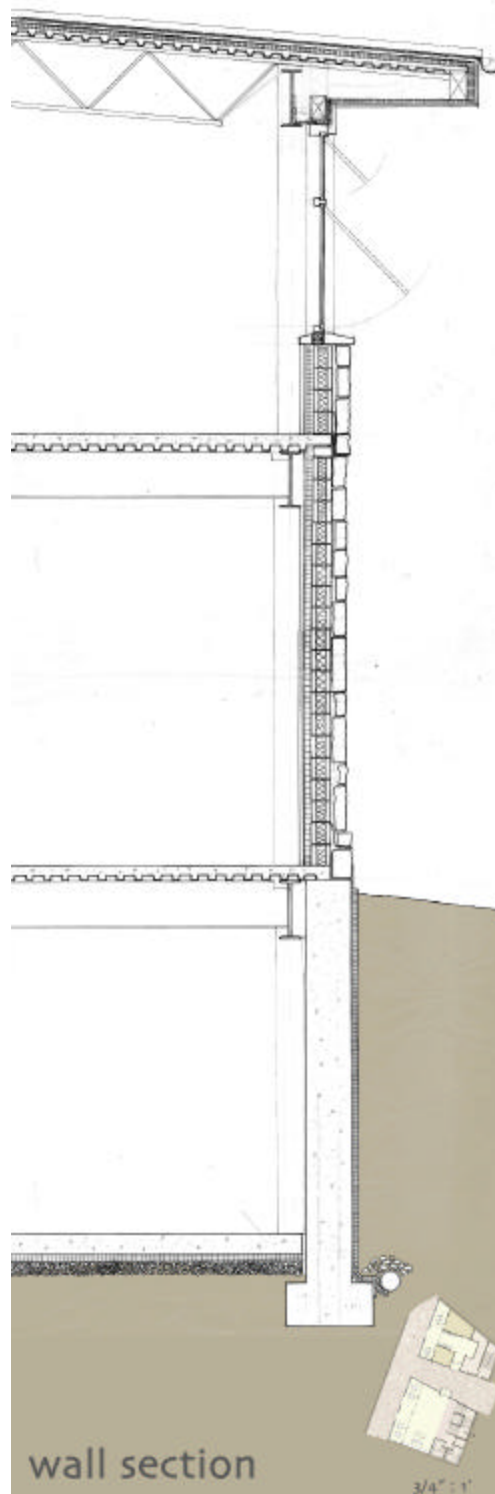


Figure 92: Wall section through the south wall of The Hub building. The pavilions are all constructed with steel frames and enclosed by light glass walls on the park side and heavy stone walls facing the city.

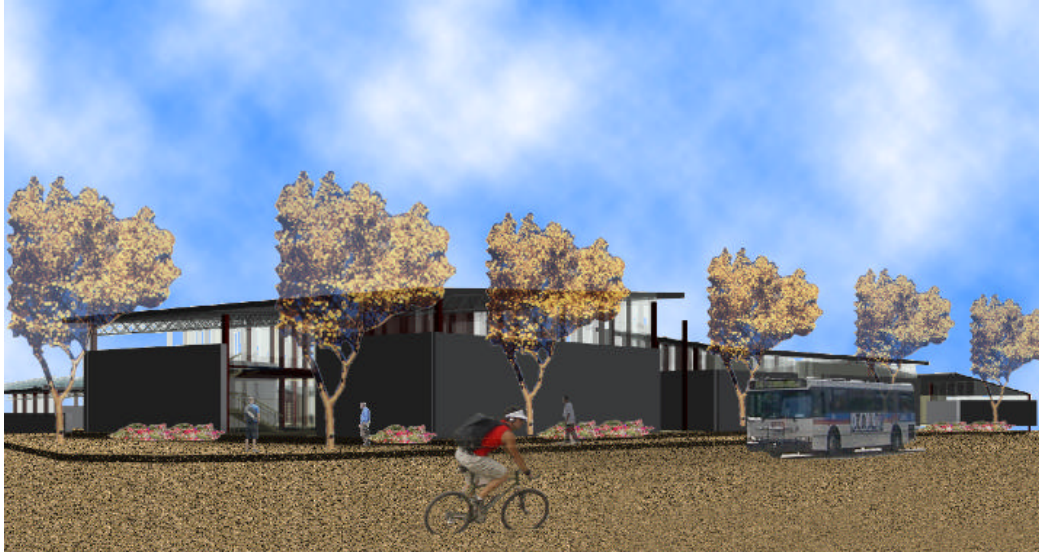


Figure 93: Perspective view showing the city approach to the site at the corner of 15th Street and Little Raven Street. Looking northeast, one sees The Hub with the Peddler's Boutique in the distance.



Figure 94: Perspective view showing the approach to the site through the Confluence Station Bicycle Center. These two pavilions serve as a gateway to the site from the greenways along the two rivers.

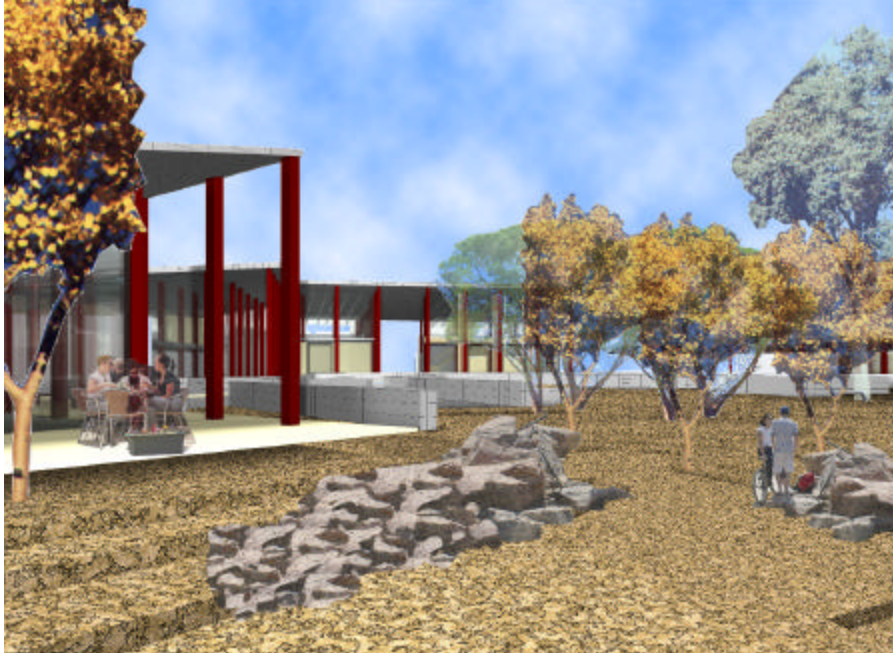


Figure 95: Perspective view taken from the western café terrace looking back towards The Hub.

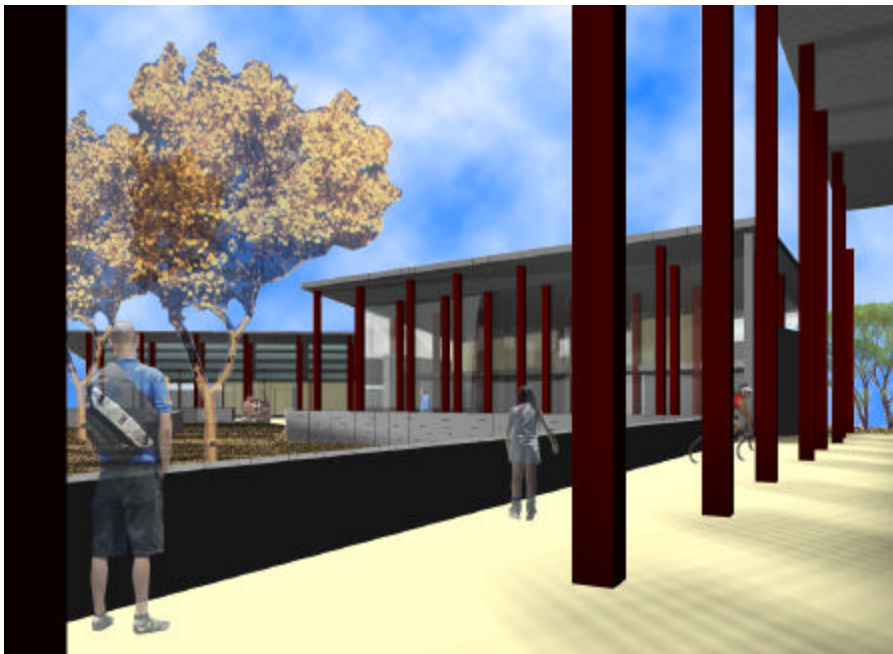


Figure 96: Perspective view taken from underneath the porch roof of The Hub building looking towards the Peddler's Boutique.

In conclusion, the development of the design of a bike station in Denver led to a careful analysis of a sensitive site, located at a critical node of existing transportation and cultural amenities. The development of the design included a thorough analysis of the site at the micro scale as well as analysis of its relationship to its surrounding context. The ultimate design for Confluence Station grew out of several non-specifically architectural proposals for how one could move through a series of spaces, created on the site, transitioning from the natural corridor to the built, urban environment. Therefore, the design for the actual architectural expression of Confluence Station still retains the possibility of taking on a variety of different forms. This experience investigated the transition that one makes between two very distinct realms which are vital to the life of both a city and its inhabitants. It explored the daily rituals and connections a Denver resident might have who would use the facilities provided by Confluence Station on a regular basis. Finally, this exploration questioned the appropriate architectural expression for such a site in Denver, questioned the viability of the program of a bike station, and questioned how one can architecturally accommodate for the space between two very distinctly different environmental realms which are both critical to a person's daily life.